



2016 Small Grains Report

Southcentral and Southeastern Idaho Cereals Research and Extension Program

Juliet Marshall, Chad Jackson, Tod Shelman, Linda Jones, Suzette Arcibal, Katherine O'Brien

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Alan Baum - Ashton
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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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2016 Small Grains Report for Southcentral and Southeastern Idaho

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

Additions and Changes:

For 2016 we started seed treating all varieties with Vibrance® Extreme seed treatment to try to match grower practices. In past years we did not treat seed in an effort to evaluate disease reactions. This year also contains a two-rep 2-row malt barley trial in Soda Springs. Data is included in this report. Other barley nurseries were not replicated and data is not included in this report.

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. 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 2016, as well as milling and baking data from trials harvested in 2015.

Materials & Methods

Locations

Cereal trials were established at six winter and five spring locations throughout SC and SE Idaho during the fall of 2015 and the spring of 2016. 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

Treated 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 reduced back to 10 feet long using glyphosate herbicide or tillage. 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. 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 (bu/A) 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 2016 was analyzed with a Foss 6500 NIR grain analyzer. Protein data are found in conjunction with the agronomic data noted above in tables 4 to 60. 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 2016 harvest in this report. Data are given for these characteristics from the 2015 harvest and are found in tables 69-80.

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

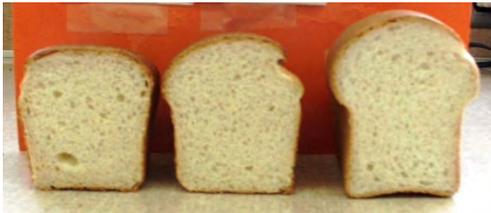
basis. Lower percentages are preferred for soft wheat; higher percentages are preferred for hard wheat.

- Hardness value: a measure of kernel hardness; generally soft white wheats are below 45, hard wheats are above 45.

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 per unit of protein; 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 ($\alpha=.05$) was used for mean comparisons.

Statistical Interpretation

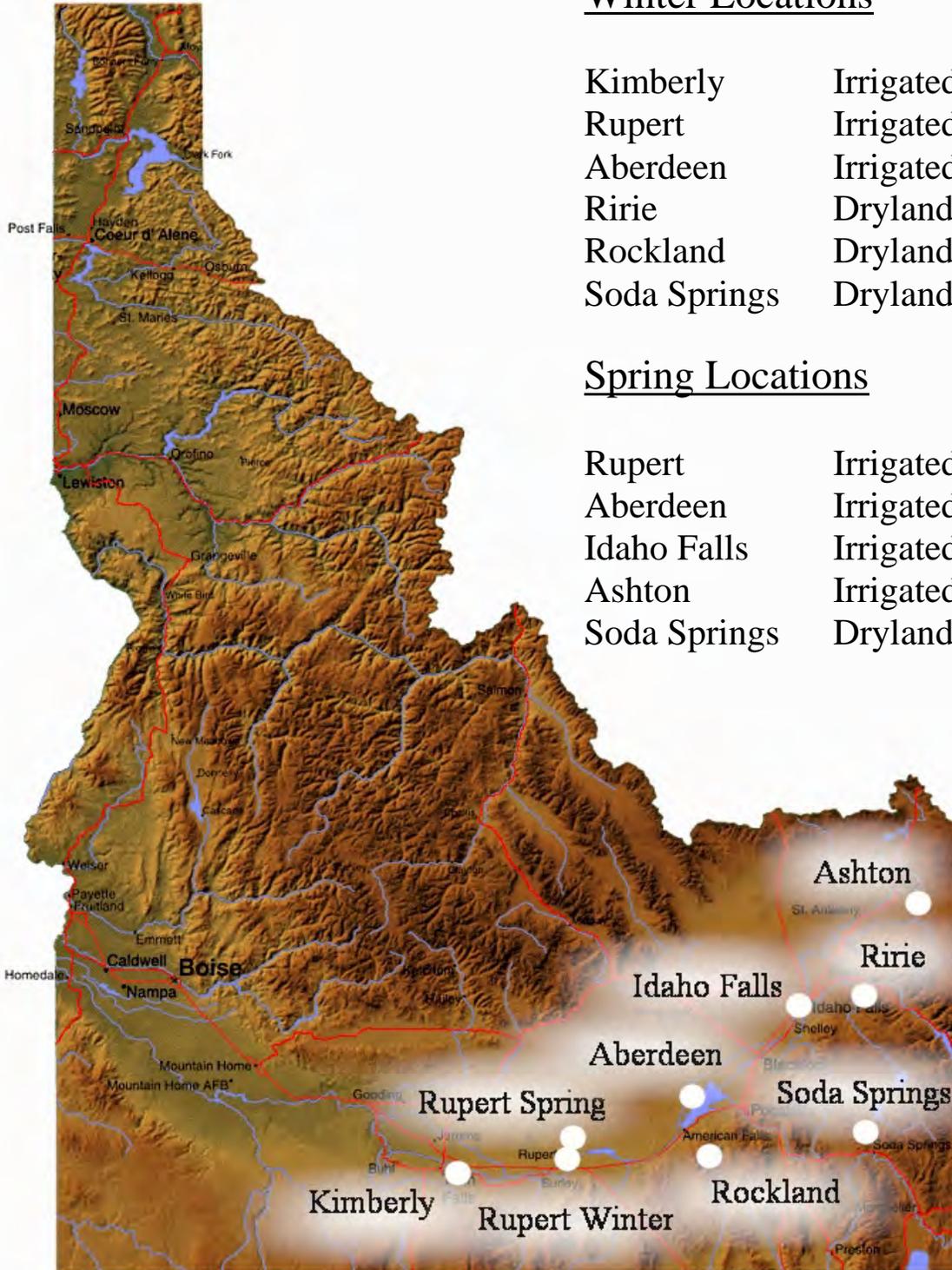
Most tables have a least significant difference (LSD) statistic at the bottom of the table. This statistic is given at the 5 percent error level and is an aid in comparing varieties. If the measured values of any two varieties within a table differ by the LSD value or more, they may be considered different 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 from 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.

Varieties Tested

A list of released varieties tested in 2015-2016 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 selected varieties is given in Table 2. 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 3 for the time period of 2006-2016.

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°33'1.24"N, 114°20'33.02"W
Elevation: 3899 ft.
Soil Type: #10 Bahem silt loam, 1-4% slopes
Previous Crop: Dry Beans
Planting Date: October 6, 2015
Harvest Date: July 27-28, 2016
Chemicals applied: Starane Ultra 6 oz/A, Axial XL 16 oz/A, Quilt Xcel 12 oz/A

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")	1.5	7.0	1.0	157	157	33 ppm	200 ppm	28 ppm
Fertilizer applied (lbs/A)				233	125		20#	
Total	1.5	7.0	1.0	390	282	33 ppm	200 ppm	28 ppm

Rupert Winter Irrigated:

Cooperator: Rett Cameron
Located at approximately 160 E 200 N Rupert, Idaho

Coordinates: 42°38'56.81"N, 113°38'3.43"W
Elevation: 4164 ft.
Soil Type: #41 Tindahay loamy sand, 0-1% slopes
Previous Crop: Sugar beets
Planting Date: October 2, 2015
Harvest Dates: July 14-15, 2016
Chemicals applied: Brox-M 1.5 pt/A, Starane Ultra 6 oz/A, Axial XL 16 oz/A, Quilt Xcel 12 oz/A

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")	0.7	7.3	<1.0	17	17	15 ppm	159 ppm	18 ppm
Fertilizer applied (lbs/A)				165	125	80#	40#	3#
Total	0.7	7.3	<1.0	182	142	15+ppm	159+ppm	18+ppm

Location Descriptions

Aberdeen Winter Irrigated:

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

Coordinates: 42°57'48.33"N, 112°49'9.07"W
Elevation: 4407 ft.
Soil Type: DcA Declo fine sandy loam, 0-2% slopes
Previous Crop: green manure oats
Planting Date: September 24, 2015
Harvest Dates: Winter Barley July 14 & 21, Winter Wheat July 20, August 3-4, 2016

Chemicals applied: Brox-M 1 pt/A, Starane Ultra 6 oz/A

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")	1.1	8.0	6.8	176	176	33 ppm	313 ppm	51 ppm
Fertilizer applied (lbs/A)				239	130	20#	20#	
Total	1.1	8.0	6.8	415	306	33+ppm	313+ ppm	63 ppm

Ririe Winter Dryland:

Cooperator: Trevor Davey

Approximately 3 ¼ miles south of Ririe Reservoir Dam on Meadow Creek. Rd.
Ririe, ID

Coordinates: 43°32'40.13"N, 111°42'33.53"W
Elevation: 5617 ft.
Soil Type: #42 Ririe silt loam, 4-12% slopes
Previous Crop: fallow
Planting Date: September 18, 2015
Harvest Date: August 2, 2016
Chemicals applied: 16 oz/A Goldsky, 5.5 oz/A LV6, .5 oz/A Powerflex

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	7.2	<1.0	65	65	17 ppm	353 ppm	12 ppm
Fertilizer applied (lbs/A)				12	12	30 #		
Total	1.4	7.2	<1.0	77	77	17+ppm	353 ppm	12 ppm

Location Descriptions

Rockland Winter Dryland:

Cooperators: Gilbert and Carl Hofmeister
 ¾ mile west of Rock Creek Rd on Deeg Rd Rockland, ID

Coordinates: 42°39'42.46"N, 112°56'34.34"W
 Elevation: 4645 ft.
 Soil Type: #51 Newdale silt loam, 4-12% slopes
 Previous Crop: fallow
 Planting Date: September 9, 2015
 Harvest Date: July 22, 2016
 Fertility:

	Organic Matter	pH	Free Lime %	winter wheat N#/A	P	K	S
12" soil test results (N & S= 0-24")	0.9	7.4	<1.0	61	17 ppm	448 ppm	42 ppm
Fertilizer applied (lbs/A)				46			25#
Total	0.9	7.4	<1.0	105	17 ppm	448 ppm	42+ppm

Soda Springs Winter Dryland:

Cooperators: Mark and Craig Ozburn
 ½ mile west of Govt Dam Rd on Ten Mile Pass Rd Soda Springs, ID

Coordinates: 42°45'54.73"N, 111°39'14.84"W
 Elevation: 6112 ft.
 Soil Type: 485AA - Foundem-Rexburg complex, cool, 1 to 8 percent slopes
 Previous Crop: barley
 Planting Date: September 23, 2015
 Harvest Date: August 23, 2016
 Chemicals applied: Axial-Star, Husky
 Fertility:

	Organic Matter	pH	Free Lime %	winter wheat N#/A	P	K	S
12" soil test results (N & S= 0-24")	1.8	7.2	<1.0	83	34 ppm	359 ppm	16 ppm
Fertilizer applied (lbs/A)				62			15#
Total	1.8	7.2	<1.0	145	34 ppm	359 ppm	16+ppm

Location Descriptions

Rupert Spring Irrigated:

Cooperator: Grant 4-D Farms
Approximately 850 N., 200 E. Rupert, ID

Coordinates: 42°44'41.75"N, 113°37'50.61"W
Elevation: 4238 ft.
Soil Type: #24 Portneuf silt loam 1-4% slopes
Previous Crop: sugar beets
Planting Date: April 7, 2016
Harvest Dates: August 9, 2016
Chemicals applied: Brox-M 1 pt/A, Starane Ultra 6 oz/A, Achieve Liquid 9 oz/A, Quilt Xcel 12 oz/A

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")	1.2	8.0	7.4	90	90	16 ppm	243 ppm	21 ppm
Fertilizer applied (lbs/A)				275	165			
Total	1.2	8.0	6.9	365	255	16 ppm	243 ppm	21 ppm

Aberdeen Spring Irrigated:

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

Coordinates: 42°57'39.36"N, 112°49'17.37"W
Elevation: 4407 ft.
Soil Type: DeA Declo loam, 0-2% slopes
Previous Crop: Green manure oats
Planting Date: April 8, 2016
Harvest Date: August 15, 17-18, 2016
Chemicals applied: Brox-M 1 pt/A, Starane Ultra 6 oz/A, Quilt Xcel 12 oz/A

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")	0.9	8.1	8.2	173	173	25 ppm	260 ppm	44 ppm
Fertilizer applied (lbs/A)				189	80	20#	20#	100# S, 20# SO ₄
Total	0.9	8.1	8.2	362	253	25+ppm	260+ ppm	44+ppm

Location Descriptions

Idaho Falls Spring Irrigated:

Cooperator: Marc Thiel
Just north of 17th S. on 45th West Idaho Falls, ID

Coordinates: 43°29'2.07"N, 112° 7'24.05"W
Elevation: 4686 ft.
Soil Type: #23 Pancheri silt loam, 2-4% slopes
Previous Crop: potatoes
Planting Date: April 12, 2016
Harvest Date: August 23, 2016
Chemicals applied: Brox-M 1 pt/A, Starane Ultra 6 oz/A, Quilt Xcel 12 oz/A, Achieve Liquid 9 oz/A

Fertility:

	Organic Matter	pH	Free Lime %	Hard Spring wheat N#/A	Soft white spring wheat N #/A	P	K	S
12" soil test results (N & S= 0-24")	1.7	8.1	5.6	73	73	10 ppm	120 ppm	26 ppm
Fertilizer applied (lbs/A)				253	122	31#		
Total	1.7	8.1	5.6	326	195	10+ppm	120 ppm	26 ppm

Ashton Spring Irrigated:

Cooperator: Alan Baum
Approximately 4125 E., 1200 N. (Reclamation Rd) Ashton, ID

Coordinates: 44° 3'25.66"N, 111°19'53.75"W
Elevation: 5588 ft.
Soil Type: #72 Marystown silt loam 1-4% slopes
Previous Crop: potatoes
Planting Date: May 2, 2016
Harvest Date: September 1, 2016
Chemical applied: Brox-M 1 pt/A, Axial XL 16 oz/A, Starane Ultra 6 oz/A, Quilt Xcel 12 oz/A

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")	2.9	6.4	<1.0	106	106	12 ppm	205 ppm	25 ppm
Fertilizer applied (lbs/A)				118	78	17#		17#
Total	2.9	6.4	<1.0	224	184	12+ppm	205 ppm	25+ppm

Location Descriptions

Soda Springs Spring Dryland:

Cooperators: Kyle Wangemann and Scott Brown
 3.5 miles N of Hooper Rd on 3 mile Knoll Rd. Soda Springs, ID

Coordinates: 42°47'10.95"N, 111°35'37.63"W
Elevation: 6280 ft.
Soil Type: 705AA Lostine -Foundem complex, 1 to 4 percent slopes
Previous Crop: spring barley
Planting Date: May 4, 2016
Harvest Date: August 31, 2016
Chemicals applied: Axial-Star, Husky
Fertility:

	Organic Matter	pH	Free Lime %	Hard Spring wheat N#/A	Soft white spring wheat N #/A	P	K	S
12" soil test results (N & S= 0-24")	2.5	6.1	<1.0	58	58	49 ppm	449 ppm	18 ppm
Fertilizer applied (lbs/A)				60	60			
Total	2.5	6.1	<1.0	118	118	49 ppm	449 ppm	18 ppm

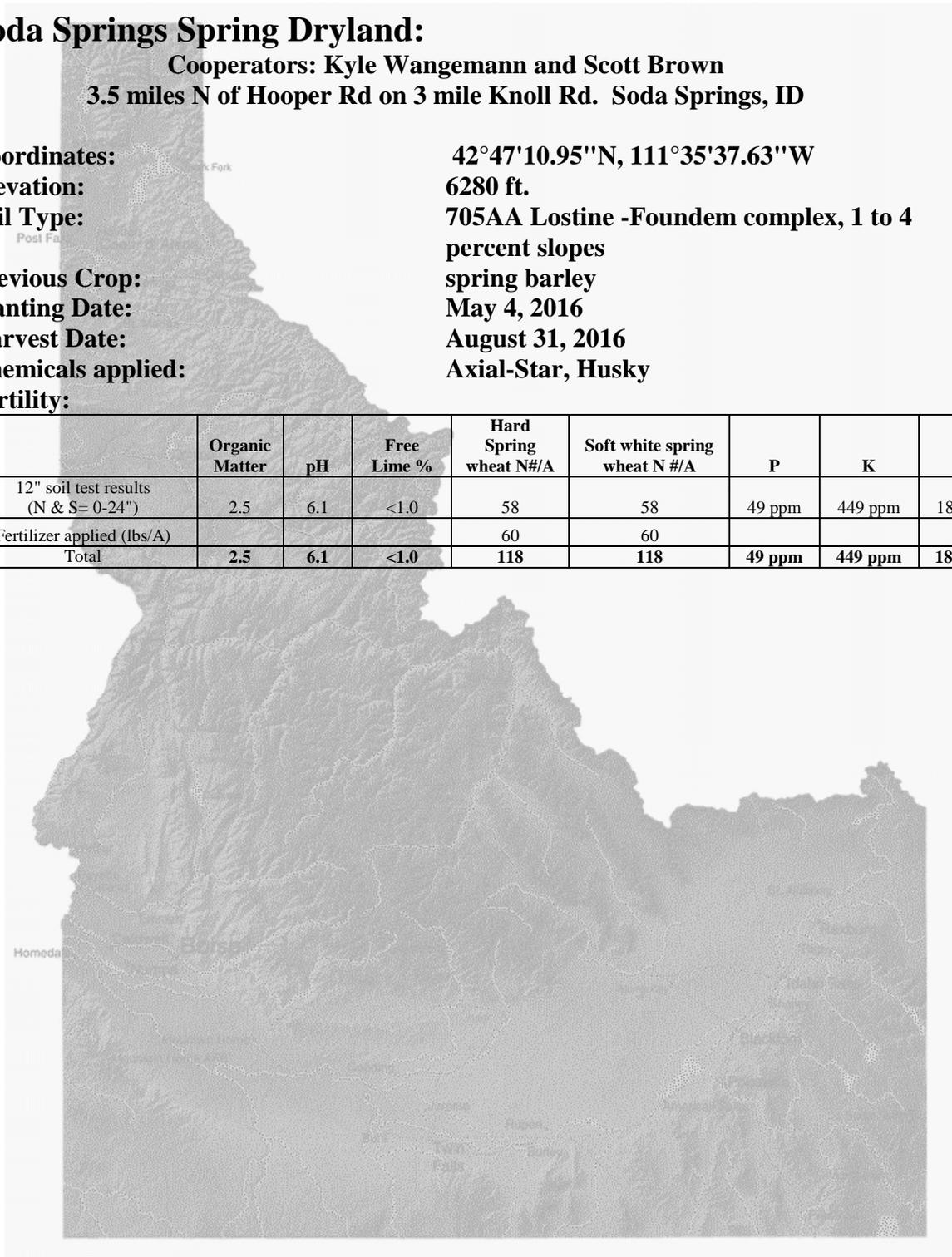


Table 1. Released varieties tested in 2015-2016 with seed size and adjusted seeding rate.

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						
Bobtail	OR208047P94	36	12,777	78	2013	Oregon AES, USDA
Brundage	ID86-14502B	38	12,096	83	1996	Idaho AES
Bruneau	ID93-64901A	37	12,427	80	2009	Idaho AES
Eltan	WA7431	34	13,540	74	1990	Washington State University and USDA-ARS
Jasper	WA 8169	36	12,777	78	2015	Washington State University and USDA-ARS
LCS Artdeco	NSA06-2153A	47	9,755	103	2011	Limagrain Cereal Seeds, LLC
LCS Biancor		42	10,800	93	2013	Limagrain Cereal Seeds, LLC
LCS Drive	LWW12-7105	40	11,340	88	2015	Limagrain Cereal Seeds, LLC
Madsen	WA7163	40	11,340	88	1988	Washington, Idaho & Oregon AES, USDA
Norwest Duet	LOR-092	41	11,063	90	2015	OSU /Limagrain Cereal Seeds, LLC
Norwest Tandem	LOR-334	35	12,960	77	2016	OSU /Limagrain Cereal Seeds, LLC
Otto	WA008092	35	12,960	77	2011	Washington State University and USDA-ARS
Stephens	OR65-116	48	9,450	106	1977	Oregon AES, USDA
SY Assure	SY 96-2	46	9,969	100	2016	Syngenta Cereals
SY Ovation	03PN108#21	52	8,808	114	2011	Syngenta Cereals
UI Castle CLP	IDN 09-DH10	30	15,376	65	2015	Idaho AES / Limagrain Cereal Seeds
UI Magic CLP	IDN 09-DH11	35	12,960	77	2015	Idaho AES / Limagrain Cereal Seeds
UI Palouse CLP	IDN 3_5_10	36	12,777	78	2015	Idaho AES / Limagrain Cereal Seeds
UI Sparrow	IDO1108DH	38	12,096	83		Idaho AES
UI-WSU Huffman	IDN-03-29902A	34	13540.3	74	2014	UI, WSU / Limagrain Cereal Seeds
WB 456	BU6W99-456	49	9,257	108	2008	WestBred / Monsanto
WB-528	BZ6W98-528	49	9,353	107	2005	WestBred / Monsanto
WB1376CLP	WB-1030CL	44	10,309	97	2015	WestBred / Monsanto
WB1529	BZ6W07-436	50	9,164	109	2014	WestBred / Monsanto
WB1783	BZ6W09-471	43	10,673	94	2016	WestBred / Monsanto
Hard Red and White (W) Winter Wheat						
Bearpaw	MTS0721	33	13,745	73	2011	Montana AES
Colter	MT08172	35	12,960	77	2013	Montana AES
Curlew	UT9325-55	36	12,600	79	2009	Utah AES, USDA
Deloris	UT2030-32	40	11,484	87	2002	Utah AES, USDA
Garland	UT1706-1	38	12,096	83	1992	Utah AES, USDA
Golden Spike (W)	UT1944-158	36	12,600	79	1999	Utah AES, USDA
Greenville	UT9743-42	37	12,259	82	2011	Utah AES, USDA
Judee	MTS0713	36	12,600	79	2011	Montana AES
Juniper	IDO 575	40	11,484	87	2005	Idaho AES, USDA
Keldin	ACSS5017	52	8,808	114	2011	WestBred / Monsanto
LCS Colonia	NIC 05-4711-B	38	11,937	84	2013	Limagrain Cereal Seeds, LLC
LCS Jet	NSA 7208	47	9,651	104	2015	Limagrain Cereal Seeds, LLC
Loma	MTS1224	37	12,427	80	2016	Montana AES
Lucin-CL	UT10322	40	11,484	87	2011	Utah AES, USDA
Manning	UT89099	36	12,777	78	1979	Utah AES, USDA
Northern	MT0978	25	18,144	55	2015	Montana AES
Norwest 553	ORN00B553	41	11,200	89	2007	Oregon State AES, USDA-ARS, Limagrain U.K.
Promontory	UT1567-51	41	11,063	90	1990	Utah AES, USDA
SY Clearstone 2CL	MTCL1077	30	15,120	66	2012	Syngenta Cereals
SY Touchstone (W)	04PN028B-3	33	13,957	72	2016	Syngenta Cereals
UI Silver (W)	IDO658B	39	11,782	85	2011	Idaho AES, USDA
UI SRG	IDO656	43	10,549	95	2012	Idaho AES, USDA
UICF-Grace (W)	IDO651	40	11,484	87	2009	Idaho AES, USDA
Utah 100	UT1650-150	43	10,673	94	1997	Utah AES, USDA
Warhorse	MTS0808	34	13,540	74	2013	Montana AES
WB3768 (W)	MTW08168	40	11,340	88	2013	Montana AES / WestBred
Whetstone	W98-344	36	12,777	78	2009	Syngenta Cereals
Yellowstone	MT00159	35	12,960	77	2005	Montana AES

¹Adjusted 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 2015-2016 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						
Alturas	IDO526	33	13,745	73	2002	Idaho AES, USDA
Babe	WA008039	40	11,340	88	2009	Washington AES, USDA
Diva	WA008090	45	10,080	99	2010	Washington AES, USDA
Louise	WA7921	46	9,861	101	2004	Washington AES, USDA
Melba (club wheat)		39	11,631	86		Washington AES, USDA
Seahawk	WA8162	42	10,800	93	2014	Washington AES, USDA
SY Saltese	SY3024-2	56	8,100	123	2016	Syngenta Cereals
Tekoa	WA8189	38	11,937	84	2016	Washington AES, USDA
UI Pettit	IDO632	32	14,175	71	2006	Idaho AES, USDA
UI Stone	IDO599	36	12,600	79	2012	Idaho AES / Limagrain Cereal Seeds
WB1035 CL		45	10,080	99	2015	WestBred / Monsanto
WB6121		45	10,080	99	2016	WestBred / Monsanto
WB6430	BZ608-125	36	12,600	79	2014	WestBred / Monsanto
Hard Red Spring						
Alum		40	11,340	88	2015	Washington AES, USDA
Bullseye	B02-0081	34	13,341	75	2009	Syngenta Cereals
Cabernet	95WV10616	33	13,745	73	2007	Syngenta Cereals
HRS 3419	LNR10-0119	34	13,341	75	2015	Winfield Solutions, LLC, A Land O'Lakes Company
HRS 3504		35	12,960	77	2015	Winfield Solutions, LLC, A Land O'Lakes Company
HRS 3530		42	10,800	93	2015	Winfield Solutions, LLC, A Land O'Lakes Company
HRS 3616		29	15,641	64	2016	Winfield Solutions, LLC, A Land O'Lakes Company
Jefferson	IDO462	40	11,340	88	1998	Idaho AES, USDA
Kelse	WA007954	41	11,063	90	2008	Washington AES, USDA
LCS Iron	11SB0096	36	12,600	79	2015	Limagrain Cereal Seeds, LLC
LCS Luna	10SB0087-B	38	11,937	84	2016	Limagrain Cereal Seeds, LLC
SY Basalt	04W40240R	36	12,600	79	2014	Syngenta Seeds, Inc
SY Coho	04W40292R	45	10,080	99	2015	Syngenta Seeds, Inc
SY Selway	04PN3001-2	38	11,937	84	2015	Syngenta Seeds, Inc
WB9200		36	12,600	79	2016	WestBred / Monsanto
WB9377		39	11,631	86	2016	WestBred / Monsanto
WB9411	BZ908-418	37	12,259	82	2015	WestBred / Monsanto
WB9518		44	10,309	97	2015	WestBred / Monsanto
WB9668	BZ908-552	38	11,937	84	2014	WestBred / Monsanto
Hard White Spring Wheat						
Dayn	WA8123	40	11,340	88	2012	Washington AES, USDA
Klasic	NK77S1817	40	11,340	88	1982	Northrup-King Co., Minneapolis, MN
LCS Atomo	06SB0086	36	12,600	79	2013	Limagrain Cereal Seeds, LLC
LCS Star	08SB0658-B	32	14,175	71	2013	Limagrain Cereal Seeds, LLC
Snow Crest	BZ998-247W	45	10,080	99	2004	WestBred / Monsanto
SY Teton	SY10136	47	9,651	104	2015	Syngenta Seeds, Inc
UI Platinum	IDO694C	48	9,450	106	2014	Idaho AES, Limagrain Cereal Seeds
WB-Paloma	BZ904-331WP	37	12,259	82	2010	WestBred / Monsanto
WB7328	BZ9S09-0133W	46	9,861	101	2015	WestBred / Monsanto
WB7589	BZ9S09-0735W	48	9,450	106	2015	WestBred / Monsanto
Alzada	YU894-75	46	9,861	101	2004	WestBred / Monsanto
Winter Barley						
Alba	OR77	41	11,200	71	2010	Oregon AES, USDA
Buck	09-OR-86	33	13,745	58	2014	Oregon AES, USDA
Charles (malt)	94Ab1274	45	10,080	79	2005	USDA-ARS, Aberdeen
Eight-twelve	79Ab812	35	12,960	62	1988	Idaho AES, USDA
Endeavor (malt)	95Ab2299	42	10,930	73	2008	Idaho AES, USDA
Kamiak	WA2084-63	34	13,341	60	1971	Washington AES, USDA
Lightning	10.0860	43	10,549	76	2016	Oregon AES, USDA
Maja	OR81	35	12,960	62	2009	Oregon AES, USDA
Schuyler	NY5619B-3B	31	14,872	54	1969	Cornell AES, USDA
Sprinter	BU583-50	39	11,782	68	1987	WestBred / Monsanto
Streaker	OR85	30	15,376	52	2011	Oregon AES, USDA
Strider	ORW6	38	11,937	67	1998	Oregon AES, USDA
Sunstar Pride	SDM204-B	31	14,632	55	1995	Sunderman Breeding, Twin Falls, ID
Thunder	10.0777	49	9,257	86	2016	Oregon AES, USDA
Verdant	OR712	34	13,341	60	2014	Oregon AES, USDA
Wintmalt		44	10,309	78	2014	KWS Lochow/ Tri-State Seed Company

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

Table 1 (cont'd). Released varieties tested in 2015-16 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						
f	Altorado	BZ509-601	48	9,450	85	2016	Highland Specialty Grain
f	Baronesse	NS078054	45	10,080	79	1992	Highland Specialty Grain
f	Champion	YU501-385	53	8,558	93	2007	Highland Specialty Grain
f	Claymore	BZ509-216	50	9,072	88	2015	Highland Specialty Grain
f	Clearwater	01ID435H	42	10,800	74	2007	Idaho AES, USDA
f	Harriman	08ID2661	44	10,309	78	2015	Idaho AES, USDA
f	Idagold II	C32	43	10,549	76	2002	Coors Brewing Co. Inc., Burley, ID
f	LCS Vespa	LN 0920	42	10,800	74	2013	Limagrain Cereal Seeds, LLC
f	Lenetah	01Ab11107	49	9,257	86	2008	Idaho AES, USDA
f	Oreana	BZ509-448	46	9,861	81	2015	Highland Specialty Grain
f	RWA 1758	RWA 1758	50	9,072	88	2014	Highland Specialty Grain
f	Sawtooth	08ID1549	44	10,309	78	2015	Idaho AES, USDA
f	Xena	BZ594-19	49	9,257	86	2000	Highland Specialty Grain
food	CDC Fibar	HB373	36	12,600	63	2003	CDC University of Saskatchewan, Saskatoon
food	Julie	03AH6561-94	49	9,257	86	2010	Idaho AES, USDA
food	Kardia	2Ab09-X06F084-51	49	9,257	86	2016	Idaho AES, USDA
food	Transit	03AH3054-51	46	9,861	81	2010	Idaho AES, USDA
m	ABI Balster	B0811	48	9,450	85	2015	Busch Agricultural Resources, LLC, Ft. Collins, CO
m	ABI Growler	2B09-3425	46	9,861	81	2015	Busch Agricultural Resources, LLC, Ft. Collins, CO
m	ABI Voyager	B3719	53	8,558	93	2011	Busch Agricultural Resources, LLC, Ft. Collins, CO
m	AC Metcalfe	TR232	48	9,450	85	1994	Agriculture Canada
m	ACC Synergy		51	8,894	90	2015	Agriculture Canada
m	CDC Copeland	TR150	50	9,072	88	1999	CDC University of Saskatchewan, Saskatoon
m	CDC Meredith	TR05104	41	11,063	72	2008	CDC University of Saskatchewan, Saskatoon
m	Conrad	B5057	45	10,080	79	2004	Busch Agricultural Resources, LLC, Ft. Collins, CO
m	Harrington	S76333	48	9,450	85	1981	University of Saskatchewan
m	Hockett	MT910189	52	8,723	92	2010	Montana AES
m	LCS Genie	NSL07-8424-A	45	10,080	79	2011	Limagrain Cereal Seeds, LLC
m	LCS Odyssey	NSL08-4556-A	62	7,316	109	2015	Limagrain Cereal Seeds, LLC
m	LCS Westminster		46	9,861	81	2016	Limagrain Cereal Seeds, LLC
m	Merem	02Ab17271	50	9,072	88	2014	USDA ARS, Idaho AES
m	Moravian 150		51	8,894	90	2016	Coors Brewing Co. Inc., Burley, ID
m	Moravian 169		49	9,257	86	2016	Coors Brewing Co. Inc., Burley, ID
m	Moravian 69	C69	46	9,861	81	2005	Coors Brewing Co. Inc., Burley, ID
m	ND Genesis	2ND25276	47	9,651	83	2015	North Dakota State University, NDAES
	Six-Row Spring Barley						
m	Celebration	6B01-2218	39	11,631	69	2008	Busch Agricultural Resources, LLC, Ft. Collins, CO
f	Goldeneye	UT95B1216-4087	40	11,340	71	2005	Utah AES, USDA
f	Herald	00ID1550	42	10,800	74	2006	Idaho AES, USDA
m	Lacey	M98	42	10,800	74	2000	Minnesota AES, USDA
f	Millennium	UT004603	40	11,340	71	2000	Utah AES, USDA
m	Quest	M122	41	11,063	72	2010	Minnesota AES, USDA
m	Tradition	6B95-2482	41	11,063	72	2003	Busch Agricultural Resources, LLC, Ft. Collins, CO

¹Adjusted 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 2015 provided good conditions for planting winter grain on both irrigated and dryland ground. Pre- or post-planting irrigation was required in irrigated trials for seed to adequately germinate and establish. The dryland conditions benefited from some September-October rains that improved the soil moisture prior to planting in eastern Idaho. Subsoil moisture was low going into the winter.

Spring planting conditions were good for stand establishment, and moisture in March, April and May were above average, resulting in excellent establishment and early growth. Timely

(early) seeding resulted in excellent tillering and long periods of crop growth.

Weather Conditions

Natural precipitation was at the 10-year average through February, and was slightly above the 100-year average (see Figure 1). The fall was warm, and the long, warm fall contributed to high aphid populations and the subsequent widespread transmission of barley yellow dwarf virus. Widespread BYD symptoms developed in the spring of 2016 in the winter wheat and barley crops, but was not as severe as the previous year. Winter temperatures, especially mid-January through April,

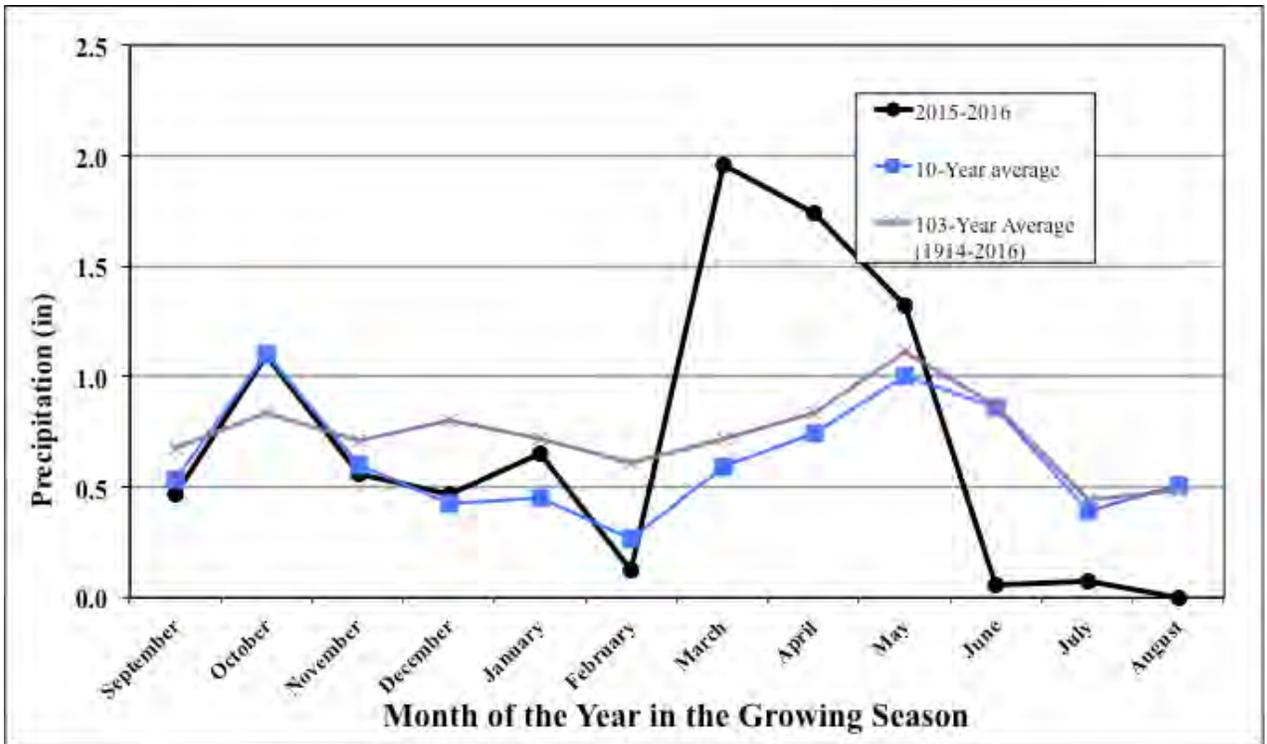


Chart 1. 2015-2016 growing year precipitation recorded at Aberdeen, ID, versus 10-year and 103-year averages. Source: Agrimet and National Weather Service data.

were above average, and resulted in an early break of winter dormancy. Early spring rains resulted in excellent growing conditions until irrigation was available after April. Higher than expected spring rains contributed to subsoil moisture reserves, which was able to provide needed moisture to dryland grains and provide a subsoil buffer for irrigated production.

The precipitation in June and July were well below average, but there was enough subsoil moisture to finish off the dryland winter crop and in some cases, the dryland spring crop.

There was some winter-kill in irrigated winter wheat and winter barley, with overall spring stands of winter grains being very good throughout the area. Some of the hard red nurseries had lower spring stands than the soft white winters, and the winter barley at Aberdeen had lower stands than did the Rupert nursery. Good soil moisture heading into the winter reduced winter-kill.

A very moderate weather pattern was established in May, with temperatures not getting high during the day and cool nights, resulting in excellent grain growing and grain filling conditions. Heading dates for winter and spring crops were earlier than the previous ten-year average. Early heading of winter wheat, spring wheat, and spring barley has occurred the last two years when compared to the previous ten years (Table 3). Winter wheat headed a week earlier than the previous ten-year average. Spring wheat and spring barley headed eight days earlier than the previous ten-year average. Plant heights were significantly greater for winter wheat, and about average for spring

wheat spring barley. Lodging was average for winter and spring wheat, and relatively low for spring barley. Interestingly, trial yields for winter wheat and spring wheat were average, and above average for spring barley. Test weights were below average for winter wheat, and spring wheat and barley were higher than average. Barley test weight was high as was overall quality of spring barley production in the region.

Record grower yields were recorded throughout the area, with 2015-16 statewide average wheat yields estimated at 91 bu/A (Idaho Ag Statistics).

Disease and Insect Problems

Wireworms (of various species) were damaging in many areas across the entire region, reducing stand and yield of spring wheat and barley in dryland production, but the severity in 2016 was not as great as in 2014 and 2015. Winter grain could be used to avoid wireworm damage as wireworms are less active in warmer, drier soils when winter wheat would be planted. However, emergence in dry soils is problematic, and winter kill increases under dry conditions. Insecticides applied as seed treatments reduce but do not control wireworms and the resultant feeding damage.

Wheat stem sawfly (*Cephus cinctus* Norton) was not as damaging in dryland spring grain when compared previous years. The discovery of **Hessian fly** (*Mayetiola destructor* Say) in southern Idaho in 2015 raised a great deal of concern, as many of our currently grown varieties are not Hessian Fly resistant. The Hessian fly larvae were discovered in late-planted spring wheat in the Parma

area, and also can damage spring barley. There were no additional reports of Hessian Fly in the 2016 season.

Volunteer grain continues to contribute to green bridge conditions. Early planted wheat suffered from **barley yellow dwarf** (BYD) and **wheat streak mosaic** (WSMV) virus infections. Stripe rust infected susceptible varieties of fall planted wheat. This facilitated disease carryover to the 2016 spring grain of stripe rust and virus diseases. Late-planted spring wheat and barley suffered from infections of Barley Yellow Dwarf virus (BYD) and wheat streak mosaic virus (WSMV). Overall, the great growing conditions during the spring of 2016 prevented crop stress and reduced impact from virus diseases, but facilitated stripe rust infection.

Stripe rust (*Puccinia striiformis* f.sp. *tritici*) may have overwintered near the Utah – Idaho border, and was severe in Brundage soft white winter wheat and in susceptible spring wheat varieties, even under dryland conditions. Surprisingly, it did not spread as much as expected. Stripe rust was also a problem in northern Idaho, mostly in winter wheat, where one to two fungicide applications were used to reduce yield loss in susceptible varieties. Heavy spring rains in many dryland production areas allowed stripe rust to become severe. Actively scouting fields of susceptible varieties is recommended in order to identify infection as early as possible. Fungicides can then be applied to prevent yield loss especially should stripe rust infect wheat plants prior to flowering. Susceptible varieties, such as Brundage, may need two fungicide applications to control stripe rust. Stripe rust developed in spring barley and

triticale, but was not severe in commercial production. Two-rowed barleys tend to have greater levels of resistance to stripe rust than do the six-rowed varieties.

Barley scald (*Rhynchosporium secalis*) did not reach the damaging levels of the previous years and was seen at very low levels. In most years, low levels of early season scald infection do little to affect the barley crop and yield, and can be ignored. Previous years (2009-2011) were not by any means typical, and scald ran rampant in fields in 2009 where application of fungicides would have prevented significant crop loss. This will be a disease to watch in future years, especially as production of winter barley increases the chances of high levels of disease developing in winter barley which then may affect early development in spring barley.

Fusarium spp. causing foot rot, some **Rhizoctonia spp.** and **Take-all** (*Gaeumannomyces graminis* var. *tritici*) were prevalent in areas where grain followed grain. Where irrigation was not increased to compensate for moisture deficits, dry land foot rot was present but not severe. There were several spring wheat fields with severe Pythium and Rhizoctonia infections that occurred when volunteer plants were killed with herbicide immediately prior to planting. It is highly recommended that burn down of volunteer grain happens in the fall prior to winter conditions, or at least two to three weeks prior to spring sowing. Diseases from dying grain can cause a great deal of damage to the developing roots and seedlings of the newly planted crop.

Luckily, growing conditions in 2016 were not conducive to grain infections of **Fusarium head blight** (also called Head Scab, causal organisms *Fusarium graminearum* and other *Fusarium* spp.). A significant problem in 2015, reduced yields and contaminated grain with toxins over multiple years - in 2011, 2012, 2014 and 2015. In 2015, *Fusarium graminearum* was widespread but **was not** restricted to where wheat follows corn production. This disease was also severe where spring barley followed corn, as the fungus reproduces extensively on corn residue. Rejectable levels of deoxynivalenol toxin, (abbreviated as DON and also called VOM, short for vomitoxin), which is a by-product of the fungal infection process, contaminated 2015 malt barley. It is highly recommended that irrigated spring grain be treated with an appropriate fungicide at flowering to reduce infection, especially when a hard white or hard red spring wheat or barley follows corn production. It is essential that a **triazole** fungicide be utilized, as strobilurin fungicides are ineffective in reducing the accumulation of toxins. (See Addendum 5 for 2015 data of spring wheat reaction to FHB infection, and Addendum 5 for spring barley. Current year nurseries were not as effective in determining FHB reactions, so 2015 data is repeated here.)

The “**Spot Form of Net Blotch**” (SFNB) *Pyrenophora teres* f. *maculata* was first diagnosed in a few fields near Blackfoot in 2013. In 2014, SFNB became severe in many areas throughout Idaho and Montana. This disease occurs widely in North Dakota and can reduce yields by up to 50% and grain weight by 20%. SFNB was still problematic in 2015, especially in no-till situations, but

was not as severe in 2015, and was at a very low incidence and severity in 2016. Areas that have reduced tillage and low crop diversity are at increased risk as this disease survives in barley stubble. Some varieties are more susceptible than others. Crop rotation and fungicide applications significantly reduce the impact of this disease. Fields that had been sprayed with fungicides at herbicide timing have been observed to have significantly less disease. Additional testing to develop control recommendations in our environment is required.

Cereal cyst nematode (*Heterodera avenae*) (CCN) damage was extensive in spring wheat and spring barley fields in the northern Snake River Plain, with visible damage in crops from Rexburg, Plano, and St. Anthony through the Ashton area. CCN affects all grassy crop species, and can even infect grassy weeds. Research conducted in St. Anthony with Dr. Richard Smiley (Professor Emeritus, Oregon State University) identified resistant and tolerant varieties of spring wheat and barley, and was published in 2015. Results of those screening trials are presented in Addendum 6 for both wheat and barley. Crop rotation to broadleaf crops will reduce CCN populations in the soil.

Green Bridge, 2015 to 2016.

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 occurs in many locations in southern and southeast Idaho for several reasons: 1) late maturing tillers (in 2010) winter wheat stay green and growing even after harvest; 2) windy conditions

causes shattering of spring grains (in 2010) prior to complete maturity of the crop; 3) hail storms induce shattering of grains prior to crop maturity. Shattered grain germinates and results 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; 4) In most years, volunteer grain blown out of the combine at harvest germinates and provides a green bridge, increasing the likelihood and risk of higher disease and insect problems for the next growing season. Many growers use the volunteer growth as feed or forage for livestock, but can result in extensive carryover of pathogenic organisms from year-to-year.

Other examples include heavy, unusual rains in August of 2014 prior to harvest, which resulted in extensive losses due to sprout but also set up greenbridge conditions when grain shattered and germinated before harvesting of the 2014 crop could occur. Because of the green bridge, aphids and certain disease causing organisms can jump to the emerging winter crop, causing direct damage and / or transmitting viruses. In 2015, many growers irrigated the volunteer for forage. With an early harvest and a long warm fall of 2015, the volunteer from the spring crop was in grain fill prior to a killing frost in November. The greenbridge situation resulted in extensive BYD and stripe rust infection in the fall volunteer. Once again, as the fall of 2014 and 2015, high populations of aphids moved into the earliest emerging winter wheat and barley, contributing to a widespread occurrence of Barley Yellow Dwarf in southern Idaho. Corn is a 'silent' host of barley yellow dwarf virus, hosting high concentrations of the virus without

symptoms or damage to corn. Late in the fall season, aphids (especially English grain aphids and Bird-cherry oat aphids) moved from corn to winter cereals, landed on the newly emerged grain, and transmitted the virus to the new crop. Aphid populations built up before a killing frost in November or December (depending on location). Severe stunting and yellowing of grain in the spring became apparent, resulting in yield reductions of over 50% in the most severely affected fields. However, in the spring of 2016, excellent growing conditions prevented widespread losses from BYD.

Another disease that was worse in 2016 due to green bridge conditions and early planting of winter grain included wheat streak mosaic virus (WSM) that is transmitted by mites. The mite and the virus is also present in corn and grassy weeds, and transfers to early planted winter grain.

2016 Report: Discussion of Location Conditions and Results

Kimberly Research and Extension Center, Winter Grain

The winter wheat nurseries were planted into silt loam under dry conditions Oct 6, 2015 following dry beans. Soils were well-prepared, and plots were irrigated after planting to improve emergence. The crop suffered no winter damage and was planted late enough to avoid BYD infection. Stripe rust was not present in the fall of 2015, and was not severe during the 2016 growing season in that area. Soft white winter wheat yields were about 20 bu/A more than 2015, while hard winter wheat yields were about 8 bu/A more than 2015. Plots were harvested July 27-28th, two and a half

weeks earlier than 2014, and two days earlier than 2015. See location descriptions for details on soil type, fertilization and herbicide application.

The hard winter wheat group (Table 25) yield ranged from 140 to 170 bu/A. LCS Jet, Whetstone, Loma, and Yellowstone were the highest yielding varieties, yielding 169, 169, 167 and 167 bu/A, respectively. Site average for yield of the hard winter group was 157 bu/A. Test weight average was 62.6 lbs/bu, and grain protein average for the location was 11.1%, indicating nitrogen was limiting for yield and protein. Optimal grain protein for hard red winter wheat should be 12.5% or greater. **Averaged over all locations**, the highest yielding hard winter wheat varieties in 2016 (Table 17) were LCS Jet (145 bu/A), Norwest 553 (136 bu/A), SY Touchstone (129 bu/A), Loma (123 bu/A), and Keldin (123 bu/A). **Three-year averages** over all locations (Table 4) put LCS Jet, Norwest 553, Keldin, and Yellowstone at the top with 152, 140, 138 and 135 bu/A, respectively.

In the soft white winter group (Table 31), yield varied from 123 to 172 bu/A. Jasper (156 bu/A), UI Sparrow (153 bu/A), WB-528, (151 bu/A), and SY Assure (133 bu/A) were the highest yielding named varieties. Test weight averaged 61.0 lbs/bu, and grain protein average for the location was low at 8.3%, indicating nitrogen was limiting for yield and protein. LCS Drive, WB1783, SY Assure and SY Ovation were the top named varieties in the **combined irrigated trials in 2016** at 143, 142, 136 and 136 bu/A, respectively (Table 18). The top yielding soft white winter varieties **over the last three years** over all locations (Table 5)

are SY Ovation (146 bu/A), Bobtail (143 bu/A), LCS Drive (143 bu/A), and WB-528 (140 bu/A).

Rupert, Rett Cameron, Winter Grain Plots were planted Oct 2nd in loamy sand soil following sugar beets into good soil moisture. Spring stands were excellent, with no winter kill and no visual symptoms of BYD occurring at this site. Plots were harvested July 14-15th, early due to the field being planted into a surrounding winter barley field, resulting in very low winter wheat yields. See location descriptions for details on soil type, fertilization and herbicide application.

Average yield for the winter barley varieties (Table 36) was 132 bu/A, down 10 bu/A from 2015, and varied from 90 (Verdant) to 155 bu/A. The highest yielding named varieties included Eight-Twelve (145 bu/A), Strider (142 bu/A), and Alba (141 bu/A). Proteins were 10.6%, there were high thins, and there was no lodging. **Combined over the irrigated locations** (Table 19), Lightning, Alba, Endeavor and Thunder were the highest yielding barley lines (161, 160, 152, and 151 bu/A, respectively). **Over three years** (Table 6), the winter feed lines yielded highest at 172 bu/A (Strider), 162 bu/A (Sunstar Pride), and 161 bu/A (Eight-Twelve).

Average yield for the hard winter wheat trial (Table 26) was 84 bu/A, 43 bushels less than 2015. Yield ranged from 63 (Warhorse) to 103 bu/A (Keldin). Test weight averaged 54.8 lbs/bu, and protein averaged 14.7%, reflecting the deficit irrigation and stressful conditions. Keldin, LCS Jet, and SY Touchstone were the highest yielding named lines at 103, 100, and 97 bu/A, respectively.

Stripe rust did not significantly impact yield, and there was no lodging.

The soft white winter group (Table 32) ranged in yield from 78 to 106 bu/A. The highest yielding varieties were LCS Drive (106 bu/A), WB1529 (104 bu/A), SY Assure (103 bu/A), LCS Biancor (102 bu/A), and LCS Artdeco (102 bu/A). Test weights were below 60 lbs/bu, averaging 56.8 lbs/bu, and grain protein was at 8.9%. Nitrogen fertility was below optimum for this site. There was no lodging in the soft winter wheat nurseries.

Aberdeen R&E Center, Winter Grain

The winter trials in Aberdeen were planted September 24th. Winter barley was harvested July 14th and 21st, and the winter wheat plots harvested July 20th and August 3-4th. The preceding crop was green manure oats, and the trial location has fine sandy loam soils with high pH.

The winter barley at Aberdeen (Table 37) had little to no winter damage this year, and average spring stands were at 83-95%, with the hullless variety Buck having the lowest stands at 79%. Yields were as high as 177 bu/A with an overall average of 140 bu/A, twenty bushels less than 2015. The lowest yielding variety, Verdant, is a forage line. High yielding varieties included two new malt varieties from Oregon State University, Lightning (166 b/A) and Thunder (165 bu/A), and Alba (162 bu/A), Endeavor (156 bu/A), and Charles (151). There was significant lodging in the plots. Test weight averaged 51.4 lbs/bu and grain protein 11.8%.

The winter wheat survival (Table 27) was very good. Average spring stand for

both the hard and soft winter wheat nursery was 91-99%. Lodging was high, averaging 57%. In the hard winter group, average yields were down from 2015 by 2 bu/A, lower overall due to stripe rust, which significantly impacted yield of susceptible varieties. The higher yielding lines were up to 45 bu/A higher than the previous year. LCS Jet (165 bu/A), Norwest 553 (150 bu/A), and SY Touchstone (142 bu/A) were the top yielding varieties. Test weights were 59.6 lbs/bu overall. Grain protein averaged 14.1%. The highest yielding line, LCS Jet, had protein at 12.9%, with the hard winter wheat target at 12.5%. This indicates nitrogen fertilization was adequate to meet both protein and yield expectations.

The overall yield average in the soft white winter trial (Table 33) was 138 bu/A, the same as 2015, which stripe rust susceptible lines bringing the average yield down. The yields ranged from the low of 54 bu/A (Brundage) to a high of 185 bu/A (WB1783). The highest yielding named varieties were WB1783 (185 bu/A), LCS Drive (173 bu/A), SY Ovation (160 bu/A) and SY Assure (155 bu/A). The test weights averaged at 59.9 lbs/bu and the overall grain protein was at 12.3%. Lodging was significant.

Ririe, LDS Church Farm, Trevor Davey, Winter Wheat

This is a high elevation location (5500 ft) and is our main dryland location for winter grain. Soil moisture was good down to two feet when grain was planted September 18th into silt loam soils of pH 7.2. Grain was planted into moisture at 1.25 to 1.5 inches deep, and the soil was dry above. No winter barley was planted here due to rough conditions for winter

survival. Due to continued poor winter barley performance and weediness following poor spring stand, winter barley has not been planted since 2014. The ground was fallow in 2015, and planted into spring grain in 2014.

In 2016, the spring stand for winter wheat (Tables 28 and 34) was good, and yields were similar to 2015. Stripe rust significantly reduced the yields of several susceptible varieties, including Brundage with yields 10 bu/A lower than the trial average of 44 bu/A. The trials were harvested August 2nd.

The hard winter wheat group (Table 28) had average yields of 42 bu/A, in comparison to 2015 at 45 bu/A, 2014 at 21 bu/A, and 2013 at 15.5 bu/A. The 2016 yield range went from a low of 32 bu/A to a high of 51 bu/A. Keldin, SY Clearstone CL2, Curlew and LCS Jet were the top yielding hard winter wheat varieties, at 51, 49, 49, and 48 bu/A, respectively. Average grain protein was low at 10.7%, reflecting inadequate nitrogen to meet yield or protein in this season. Yields were significantly higher than expected when these plots were planted. Test weights were good and averaged 60.9 lbs/bu. Dryland yields **averaged over all locations and 3 years** (Table 7) averaged 48 bu/A, reflecting two relatively high yields in 2015 and 2016. The top yielding varieties include UI Silver, SY Clearstone CL2, Yellowstone, WB3768 and Curlew (56, 56, 54, 52 and 51 bu/A, respectively).

The soft white winter wheat (Table 34) yields varied from 38 bu/A (Brundage) to 55 bu/A, with the site averaging 45 bu/A, almost double the 2014 yields and 5 bushels less than 2015. Average proteins were at 10.0%, and test weights

were good, averaging 59.2 lbs/bu. The top-yielding varieties were SY Ovation, Jasper, Otto, and WB1758 (55, 52, 50, and 50, respectively). Over the **past three years**, the top yielding soft white winter varieties at this location (Table 8) were SY Ovation, Bobtail, UI Sparrow, and Bruneau, yielding 66, 64, 64, and 60 bu/A, respectively. The three-year average for grain protein was at 11.3%. Test weights were 55.7 lbs/bu, and average plant height was 26 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 9th in silt loam (pH 7.4) and harvested July 22nd. The preceding crop was winter wheat (2014) and fallow (2015). Snow mold diseases were not a significant problem, and spring stands were very good (Table 29). Dwarf bunt (*Tilletia controversa* Kuhn) was not a problem this year, but all winter varieties were included in dwarf bunt testing in Logan, UT, run by Dr. David Hole, Utah State University professor and wheat breeder. Results of the dwarf bunt variety trial screening are in Addendum 1. Resistant varieties are highly recommended in this area. When using varieties that are susceptible to dwarf bunt, it is highly recommended that seed treatments are used to prevent dwarf bunt infection.

The yield average was 43 bu/A, lower than the 2015 yield average of 47 bu/A, and higher than previous years of 2014 (37 bu/A) and 2013 (18 bu/A). Stripe rust was severe at this location and damaged susceptible to moderately resistant varieties. The yield ranged from 12 to 61 bu/A. The top yielding varieties

this year were LCS Jet (61 bu/A), Utah 100 (56 bu/A), Norwest 553 (55 bu/A), and UI SRG (52 bu/A). The soft white winter varieties WB1376CLP and Eltan were included as checks and yielded 50 and 33 bu/A, respectively. Grain protein average was 12.2%, test weight average was excellent at 62.6 lbs/bu, and there was no lodging.

Soda Springs, Mark and Craig Ozburn, Dryland Winter Wheat

Two larger dryland winter wheat trials of both hard and soft winter wheat were repeated at Soda Springs again this year at the request of area growers. The trial was planted September 23rd and harvested August 23rd. Twenty-nine varieties of hard red, hard white, and 20 soft white winter wheat varieties were included. The preceding crop was fallow.

Fall germination was good resulting in an average 93% spring stand. Natural precipitation was timely and enough to promote excellent yields. Exceptional yields occurred in both the hard red/white and soft white winter wheat nurseries, but were a little less than the high yields of 2015. Average yield for the hard winter wheat nursery was 91 bu/A (Table 30). Protein average was low (10.3%), and test weight was 59.5 lbs/bu. There were some varieties that lodged a little at these high yielding conditions. Highest yielding hard varieties included Keldin (103 bu/A), Yellowstone (101 bu/A), Norwest 553 (100 bu/A), Warhorse (98 bu/A), and SY Clearstone CL2 (97 bu/A).

Average yield for the soft white winter wheat was 93 bu/A, 20 bu/A less than in 2014, with 56.8 lbs/bu test weight and 10.8% protein. There was no lodging.

High yielding soft whites (named varieties) included Jasper (99 bu/A), UI Castle (92 bu/A), Bobtail (92 bu/A) and Bruneau (92 bu/A).

If risking planting winter wheat in this area, it is highly recommended that varieties with snow mold tolerance and dwarf bunt resistance be grown. Varieties susceptible to dwarf bunt should only be grown following appropriate seed treatments for dwarf bunt control. Ratings for varieties for dwarf bunt are included in Addendum 1, and sow mold ratings are included in Addendum 2.

Rupert, Grant 4-D Farms, Duane Grant and Alan Mohlman, Spring Grain

The spring grain variety trials in Rupert were planted April 7th, two and a half weeks later than in 2015 (March 20th) and harvested August 9th. The preceding crop was sugar beets. There were no major weather-related problems.

There was no lodging for the hard spring wheat nursery (Table 38). Average yield was 125 bu/A, compared to 105 bu/A in 2015, and 132 bu/A in 2014. Test weight average was great at 63.1 lbs/bu, and average protein was at 12.6%. The top yielding named varieties were the hard whites Dayn (154 bu/A), SY Teton (140 bu/A), LCS Star (140 bu/A) and the hard red spring wheats SY Basalt (139 bu/A with 11.2% protein) and SY Coho (138 bu/A and 12.6% protein).

Over **three years over all locations**, the highest yielding varieties under irrigation (Table 9) were Dayn (hard white spring wheat at 128 bu/A), SY Teton (126 bu/A), LCS Iron (118 bu/A and 13.4% protein), LCS Star (hard

white at 117 bu/A), and WB9411 (hard red at 116 bu/A and 14.8% protein). The average 3-year test weight was 60.0 lbs/bu, and the average grain protein was 14.0%. High protein lines were WB9668 (15.8%), Kelse (15.1%), and WB9411 (14.8%). The irrigated average yield for 2016 (Table 20) was 107 bu/A where the highest yielding varieties included Dayn (126 bu/A), LCS Star (118 bu/A), LCS Iron (117 bu/A and 12.7% protein), Cabernet (115 bu/A and 13.3% protein), and WB9411 (114 bu/A and 13.9% protein). (The Syngenta varieties were not included at the Ashton location and the averages are not truly representative of the overall average.)

The soft white spring wheat yield (Table 43) average was 124 bu/A. In 2015 it was 105 bu/A, and in 2014 the average yield at the Rupert location was 130 bu/A. In 2016, UI Stone yielded 133 bu/A, WB6430 yielded 133 bu/A, Seahawk yielded 132 and Melba (spring club) 128 bu/A. Grain protein average was at 8.7%. **Three-year averages over all locations** (Table 10) put UI Stone at the high yield (126 bu/A), followed by WB6430 (121 bu/A), and Seahawk (119 bu/A). The 2016 combined irrigated average (Table 21) was 107 bu/A. WB6430 averaged 119, UI Stone averaged 116 bu/A, Seahawk 116, and Melba spring club 113 bu/A. (The Syngenta variety SY Saltese was not included at the Ashton location the average is not truly representative of the overall average.)

The six-row spring barley trial at Rupert (Table 48) had average yields of 138 bu/A, about 26 bu/A more than 2015, with a range from 110 to 166 bu/A. There was no lodging. Lacey six-rowed was the top yielding (named) malt barley

(133 bu/A), and Millennium was the highest yielding feed (166 bu/A). Test weights averaged 51.8 lbs/bu, proteins were 10.3%, and percent plumps were 97%. **Over three years**, Millennium and Goldeneye were the highest yielding feed varieties (Table 11) at 146 and 136 bu/A, respectively, and Lacey was the highest yielding malt variety at 123 bu/A. In 2016 irrigated trials (Table 22), the top yielding varieties were Millennium (147 bu/A), and Goldeneye (136 bu/A).

Two-rowed malt barley yields (Table 52) at the Rupert location averaged 150 bu/A, compared to the 2015 average of 119 bu/A, and the 2014 average of 140 bu/A. Yields varied from 116 (ND Genesis) to 179 bu/A. LCS Odyssey had the highest yield (179) followed by Idagold II (163 bu/A), Merem (163 bu/A), Moravian 150 (161 bu/A), Moravian 169 (161 bu/A), and ABI Voyager (157 bu/A). **Three-year averages** for the malt varieties (Table 12) puts ABI Voyager, ABI Balster, LCS Genie, and ABI Growler at the top (134, 133, 132, 130, and 123 bu/A, respectively). Taking a look at irrigated averages for 2016 (Table 23), LCS Odyssey yielded 152 bu/A, Moravian 69 yielded 143 bu/A, LCS Genie yielded 140 bu/A, Moravian 150 yielded 139 bu/A, and ABI Voyager yielded 139 bu/A.

The high yielding two-rowed feed varieties (Table 57) were Claymore (164 bu/A), Harriman (164 bu/A), Oreana (158 bu/A), Idagold II (157 bu/A), and Altorado (157 bu/A). Average test weight for this trial was very high (56.7 lbs/bu) but it included the hullless feed and food barleys. The hullless, high beta-glucan food barleys Julie, CDC Fibar,

and Transit yielded 136, 107, and 93 bu/A but also had high test weights (61.7, 60.4 and 60.4 lbs/bu, respectively). Kardia is a hulled high beta-glucan line that yielded 151 bu/A. Sawtooth and Clearwater are hullless feed barleys with low-phytate endodperm, and yields were 137 and 124 bu/A respectively. The feed varieties Vespa, Champion, Xena and Lenetah were the top yielding feed lines **over three years** and all irrigated locations (Table 13) at 148, 141, 140 and 138 bu/A, respectively. In 2016, the highest yielding varieties under irrigation (Table 24) included Altorado (149 bu/A), Oreana (147 bu/A), Vespa (146 bu/A), and Xena (144 bu/A).

Aberdeen R&E Center, Spring Grain
Spring variety trials were planted April 8 and harvested August 15, 17-18. The preceding crop was green manure oats. Stripe rust of wheat was present in the season and there were significant yield impacts in the susceptible varieties. The top varieties for yield in the hard red and white trial (Table 39) were the hard white spring Dayn (160 bu/A), LCS Iron (154 bu/A and 13.4% protein), the hard white LCS Star (152 bu/A), SY Basalt (148 bu/A and 13.4% protein) and WB9518 (146 bu/A and 15.5% protein). Test weights for the hard spring wheat's averaged 60.7 lbs/bu. There was very little lodging except with three varieties: SY Coho 25%, Alum 43% (dryland adapted) and Jefferson 27%. Grain protein average 13.8%. (All hard spring wheat trials are topdressed at flowering with 40-50 units of N to promote higher protein hard spring wheat.) The high protein wheat's included WB9668 (16.0%), WB9200 (15.7%), WB9518 (15.5%), WB7328 (17.0%), and Kelse (14.9%).

The soft white spring wheat yields at Aberdeen (Table 44) averaged 117 bu/A with a range from 60 (Babe, susceptible to stripe rust) to 151 bu/A. Highest yields of named varieties were obtained from WB6121 (151 bu/A), Seahawk (145 bu/A), Melba spring club (144 bu/A) and WB6430 (137 bu/A). Test weights averaged 59.6 lbs/bu and grain protein averages were 11.5%.

Six-row barley in Aberdeen (Table 49) averaged 151 bu/A, considerably more than 2015 (127 bu/A), 2014 (127 bu/A), and 2013 (147 bu/A). Yields ranged from 117 bushels (Quest) to 180 bu/A. Millennium and Goldeneye were the two top yielding feed barley varieties, at 180 and 162 bu/A. For the six-row malt lines, Lacey, Tradition, Celebration and Quest yielded 145, 133, 130, and 117 bu/A, respectively. Grain protein for the malt lines ranged from 10.8% to 11.7%. Test weight was 49.5 lbs/bu.

Two-rowed malt barley lines averaged 144 bu/A (Table 53), 10 bu/A more than 2015, a little more than 2014, and ranged from 119 (Hockett) to 165 bu/A. The top yielding lines were LCS Odyssey (165 bu/A), Moravian 169 (164 bu/A), Moravian 69 (163 bu/A), Moravian 150 (162 bu/A) and LCS Genie (160 bu/A). Grain protein averaged 11.6%. For the feed varieties (Table 57), Claymore, Harriman, Oreana, Idagold II, Altorado, and Vespa yielded 164, 164, 158, 157, 157 and 156 bu/A, respectively. Test weight averaged 56.7 lbs/bu which is inflated by the number of hullless lines included in the trial. Hullless lines Sawtooth, Julie, Clearwater, Transit, and CDC Fibar yields were 137, 136, 124, 107, and 93 bu/A, respectively. Lodging averaged 10% and grain protein 10.5%.

These trials were not treated with growth regulators.

Idaho Falls, Marc Thiel, Spring Grain

The Idaho Falls location followed potatoes, was planted April 12th and harvested August 23rd. The surrounding field was in barley. Yields did not meet expectations due to slope in the field and run-off creating erosion in many plots.

Two-rowed malt barley yields (Table 54) averaged 116 bu/A, about the same as in 2014. Moravian 169 yielded 102 bu/A while the highest yielding variety hit 139 bu/A. Top yielding named varieties included LCS Odyssey (139 bu/A), ABI Voyager (134 bu/A), Conrad (122 bu/A), and ACC Synergy (118 bu/A). Test weight average was 53.1 lbs/bu, protein 10.5% and there was no lodging. The two-rowed feed trial (Table 59) averaged 114 bu/A, with the top yielding lines averaging 136 bu/A (Xena), 131 (Baronesse), 131 (Kardia) and 131 (Claymore). The test weight averages were high (55.9 lbs/bu) and protein was 11.3%.

The Idaho Falls six-rowed barley (Table 50) averaged 114 bu/A, below 2015 and 2014 averages. High yielding varieties include Goldeneye at 124 bu/A, Millennium at 123 bu/A, and Tradition at 112 bu/A. Test weight averaged 51.7 lbs/bu and proteins were averaging 10.7%.

Average grain yield for the hard spring wheat (Table 40) was poor at 88 bu/A, which was 3 bushels lower than the average in 2015, and less than 2014 average of 103 bu/A. Late infection from stripe rust reduced yield of susceptible varieties. Hard spring wheat ranged in yield from 76 to 105 bu/A. Average

grain protein was at 12.6%, and test weight was at 63.3 lbs/bu. The four highest yielding named varieties were WB7328 hard white (101 bu/A), WB9411 (98 bu/A and 13.7% protein), and Cabernet (96 bu/A and 12.9% protein). There was no lodging and grain protein averaged 12.6%. The surrounding field was malt barley and fertility was too low for the spring wheat trial to reach optimum yield. In combination with soil erosion affecting some plots, the spring trials at this location are too variable.

UI Stone, WB6430, SY Saltese, and Alturas topped the yield chart (Table 45) for the soft white spring wheat varieties at Idaho Falls at 106, 105, 101 and 98 bu/A, respectively. Yields ranged from 74 bu/A (Melba spring club) to 106 bu/A. Test weights were good at 62.5 lbs/bu, and grain proteins were at 9.5%.

Ashton, Alan Baum, Spring Grain

The Ashton location was planted May 2nd in silt loam soils at pH 6.4. The preceding crop was potato, and the surrounding field was spring barley. Stripe rust was also present in most areas of the upper valley. Plots were harvested September 1st.

Factors important in plant health and reducing yield potential (above stripe rust impacting crop) in this area include soil pH and nematodes. Soil pH at this location was not as low as the previous field in 2015 which was pH 6.0, which contributes to high micro-nutrient accumulations (magnesium, manganese, iron and boron). Leaf necrosis (browning) occurs at low pH, which varies from 5.3 to 6.0. In addition, high levels of nematode damage were found throughout the region, from Ashton

through St. Anthony, to Rexburg and Plano. Both factors contributed to general unthriftiness, stunting, reduced tillering and yellowing of wheat and barley. Soil amendments such as lime should help reduce the toxic accumulation of micronutrients, but crop rotation to broadleaves is the only way to reduce the impact of cereal cyst nematodes (CCN). There are different levels of resistance and tolerance in our spring wheat and barley varieties. The results from screening trials conducted in St. Anthony are provided in Addendum 6.

The average yield for the hard spring wheat (Table 41) was 88 bu/A, compared to 2015 at 94 bu/A, and 2014 at 100 bu/A. The range in yield varied from 67 bu/A (HRS 3616, which is susceptible to stripe rust) to 108 bu/A (Bulseye). Test weights were high at 63.0 lbs/A, and protein averaged 15.0%. The high yielding varieties were Bullseye (108 bu/A and 14.5% protein), followed by LCS Iron (98 bu/A and 13.8% protein), HRS 3504 (98 bu/A and 13.7% protein) and Dayn hard white (95 bu/A). The highest proteins were seen in WB9200 (17.0%) and WB9668 (17.0%) with the location average of 15.0%. There was no lodging in the hard spring wheat at this location.

In the soft spring wheat trial (Table 46), UI Stone yielded 107 bu/A, followed by Melba spring club 104 bu/A, WB6430 (102 bu/A), Seahawk (100 bu/A) and Alturas (99 bu/A). The average yield for the soft white spring trial was 96 bu/A, lower than in 2015, but similar to 2014, and ranged from a low of 84 bu/A (WB6121) to a high of 107 bu/A. The test weight average was a 63.1 lbs/A, with no lodging. Grain protein averaged

9.8%, indicating less than optimum nitrogen for yield and protein.

In the six-rowed barleys at Ashton (Table 51), the yield average was 107 bu/A, 13 bu/A less than the previous year (2015) at 121 bu/A. In the feed barley, Millennium out-yielded the other named varieties at 117 bu/A, 52.5 lb test weight and 97% plumps. Goldeneye was the closest next variety at 113 bu/A, 52.3 lb test weight and 95% plumps. The malt line Quest yielded 100 bu/A, with 54.2 lb test weight and 98% plumps, out-yielding the next malt variety by 2 bu/A.

Two-rowed malt barley yields (Table 55) ranged from 107 (ABI Growler) to 132 bu/A. The average was 116 bu/A, 18 bu less than 2015 with the highest yielding named lines being LCS Genie (132 bu/A), LCS Westminster (125 bu/A), LCS Odyssey (125 bu/A), and Moravian 150 (124 bu/A). Oreana (149 bu/A), Altorado (139 bu/A), Xena (138 bu/A) and Champion (138 bu/A) were the top yielding feed varieties (Table 60). Test weights were very high this year at this location, averaging 57.5 lbs/bu (biased upward due to the inclusion of hulless food barleys) and proteins averaged 11.0%.

Soda Springs, Kyle Wangemann and Scott Brown, Spring Grain

The only spring dryland extension trials were spring wheat and spring barley trials in Soda Springs. The nursery was planted May 4th and harvested August 31st. The previous crop was spring barley. This location was also affected by drought, significantly reducing yields.

Yield averages for the hard red and hard white spring nursery (Table 42) were 22 bu/A, less than previous year (2015 was

58 bu/A and 2014 was 45 bu/A). The range in yield went from 15 (WB9518) to 32 bu/A (Alum). The four highest yielding named varieties were Alum, the hard white Dayn (29 bu/A), hard white SY Teton (27 bu/A) and Jefferson (26 bu/A). Test weights averaged 62.2 lbs/bu, and proteins were averaging 10.8%.

For the soft white spring wheat (Table 47), the nursery averaged 35 bu/A, almost half from 2015, 10 bu/A less than 2014. The yield ranged from 29 to 43 bu/A. UI Stone, Alturas, and WB6430

were the three top yielding varieties at 43, 42, and 38 bu/A, respectively. Test weight average was 59.8 lbs/bu, and proteins were at 12.8%.

Two replications of spring barley was included at this location. Yields averaged 38 bu/A, and test weight average was 50.5 lbs/bu. Protein averaged 10.4, and plumps were good, 95%. Yields varied from 25 (Moravian 150) to 53 (LCS Odyssey). Conrad yielded 47 bu/A and Idagold II yielded 44 bu/A.

Table 2. Variety Descriptions

SPRING BARLEY

ABI Balster (B0811) – One of two 2015 releases from Busch Agricultural Resources, ABI Balster is a high yielding two-rowed spring malt barley comparable to ABI Voyager in yield but about 3-4 inches shorter. ABI Balster is average in many other agronomic characteristics and lower than Voyager for test weight.

ABI Growler (2B09-3425) – the second of two 2015 releases from Busch Agricultural Resources, ABI Growler also exhibits very high irrigated yield potential, and hits the average for test weight, heading date, proteins and plumps. In three years of testing, ABI Growler has consistently yielded in the top group of two-rowed malt lines with Voyager and Balster.

ABI Voyager (B3719) – a 2011 release from Busch Agricultural Resources, Voyager consistently out yields other two-rowed malt varieties. Three-year average yields were equivalent to ABI Balster and better than Genie, Copeland and Conrad. In 2015, Voyager was among the top-yielding (named) varieties under irrigation. Voyager has higher test weight and plumps than Conrad, is similar in heading date and protein, but is taller (2-4 inches).

AC Metcalfe (TR232) – two-rowed malting barley released in 1994 by Agriculture and Agri-Food Canada with higher yield potential and plumper kernels than Harrington. AC Metcalfe yields are lower than average and similar to Hockett. It is widely adapted to western US and Canadian conditions, but is tall and may lodge under higher production conditions. Malting quality and extract are excellent.

ACC Synergy – released in 2015 by Agriculture Canada, ACC Synergy is a two-rowed malt barley in the second year of testing in these trials. Yield in 2016 was slightly below average, with average test weight and lodging, and high plumps. In Fusarium head blight (FHB) screening trials, ACC Synergy had one of the lowest indices for infection. ACC Synergy also expressed high levels of resistance to foliar pathogens.

Altorado (BZ509-601) – Altorado is a new 2016 release from Highland Specialty Grains. Altorado is a two-rowed feed barley with high yield potential. Average irrigated yield was greater than Champion and was the top yielder for 2016 (Table 24). Altorado is similar to Champion in heading date, test weight, plant height, lodging, grain protein and plump.

Baronesse (NS078054) – two-rowed feed barley considered an industry standard. Baronesse was released in 1992 by WestBred (a unit of Monsanto), and is now handled by Highland Specialty Grain. Baronesse has been a high yielding feed line well adapted to dryland and irrigated western production environments. Baronesse will lodge under irrigation.

CDC Copeland (TR150) – a two-rowed malt variety developed by the Crop Development Centre, University of Saskatchewan and released in 1999, Copeland has been in the trials since 2009 in southern Idaho. Copeland yielded similar to Conrad and Moravian 69, and much higher than Harrington. Copeland was 3-4 in taller than average, and was average for grain protein and lodging, with good test weight. In 2015 Fusarium head blight (FHB) screening trials, CDC Copeland had the lowest indices for FHB infection.

Spring Barley (cont.)

CDC Fibar (HB373) – a high beta-glucan (waxy), hulless two-rowed food barley released by Crop Development Centre, University of Saskatchewan, Saskatoon in 2003. Of the hulless food barleys, CDC Fibar is lowest in yield but with a high average value of beta-glucan (soluble fiber) levels per 100g of 8-10g, or 8-10%. The ratio of starch type is 100% amylopectin, 0% amylose. CDC Fibar tends to be tall and will lodge, has good shattering resistance, and fair to good drought tolerance.

CDC Meredith (TR05104) – CDC Meredith is a Canadian two-rowed malt line released in 2008 by Crop Development Centre, University of Saskatchewan, Saskatoon. Yield is similar to CDC Metcalfe, with lower test weight and later maturity. Height, plumps and protein were average. Lodging was higher and heading date was later than average.

Celebration – a six-rowed malt barley released in 2008 by Busch Agricultural Resources, LLC. Released for the Midwest, Celebration has some resistance to Fusarium head blight and consistently lower toxin (DON) content in the grain. Yields are less than Tradition and better than Quest, with average test weight, while protein and lodging were higher than average.

Champion – a 2007 release from WestBred, LLC, now handled by Highland Specialty Grain. Champion is a very high yielding, two-rowed spring feed barley. Combined over locations and years, Champion yields and test weight were comparable to Xena and Lenetah under irrigation with less lodging. Champion has average height, less than average protein, test weight and plumps, and heads 1-2 days earlier than Baronesse.

Claymore (BZ509-216) – two-rowed feed originally developed through WestBred, Claymore is carried by Highland Specialty Grains. In its first year of testing in these trials, Claymore out-yielded all other feed lines, including Vespa and Champion, and had lower lodging than all other feed lines. 2016 results also show high yields, while test weight, plumps and proteins were below trial average. Claymore is 2 inches taller than Champion with slightly higher lodging.

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 high test weight and protein with lower yields. Maturity and height are average, and Clearwater has high grain protein and higher than average lodging.

Conrad (B5057) – two-rowed spring malt barley released by Busch Agricultural Resources in 2005. Conrad has average yields and test weight. Conrad is 3 inches shorter than ABI Voyager, is average for lodging, and has lower protein than average. Conrad has yielded well in the dryland upper elevation alley areas.

Goldeneye (UT95B1216-4087) – is a six-rowed feed barley released by Utah State in 2005. Goldeneye has very high yields under irrigated conditions (similar to Millennium), above average yields under dryland production, and above average test weight. When cut at soft dough, Goldeneye has

Spring Barley (cont.)

proven to be a high-yielding and high quality forage variety.

Harriman (08IS1549) – hulled, low phytate, two-rowed feed barley. Compared to the previously released hulled, low-phytate variety 'Herald' (six-rowed), Harriman has higher grain yield, higher test weight, higher inorganic P, and lower phytate P. This variety can contribute to animal production and sustainable agriculture by reducing or eliminating the need for dietary phytase supplementation and by reducing the amount of phosphorus released into the environment from animal production facilities.

Harrington – the industry standard for malt quality, Harrington is a 2-rowed malting barley released in 1981 by the University of Saskatchewan. Harrington is one of the lowest yielding and test weight malt varieties in our trials, with higher than average lodging. Under appropriate high-yield management, including the use of plant growth regulators, yield and lodging improve greatly.

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 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) – a two-rowed malt barley released in 2010 by Montana State University. Under dryland and irrigated conditions in southeast Idaho, Hockett is

agronomically similar to Harrington with higher yield, test weight, and plumps. Hockett heads 3 days earlier than Harrington and like Harrington, will lodge under irrigation. Under high-yield and input conditions, the use of plant growth regulators is encouraged.

Idagold II (C32) – a spring feed and malt line developed by Coors Brewing Company in Burley and released in 2002. Idagold is a short, low test-weight feed line with lower than average lodging. Protein is higher than Baronesse, with similar 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 (due to the hulless characteristic) and protein, similar to other food barleys, with greater percentage of seed beta-glucan (averaging 7%) than other industry standards such as CDC McGwire. Julie is the highest yielding waxy barley, out yielding CDC Fiber by 20 bu/A. Lodging of Julie is less than average, and heading date 4-5 days later than Baronesse.

Kardia (2Ab09-X06F084-51) – Kardia is a two-rowed, hulled food barley line being released in 2016 by the USDA-ARS in Aberdeen as a replacement for Salute. Yield of Kardia was higher than the hulless lines Julie and Transit and in the first three years of testing was similar in yield to Baronesse. The beta-glucan level of Kardia is 8.5% compared to 6.5% in Salute.

Lacey (M98) – a six-rowed malt variety released in 2000 by the Minnesota AES and USDA. Lacey has excellent malt quality with yields similar to Legacy and Tradition and higher test weight. Lacey is average in height, lodging and protein.

Spring Barley (cont.)

LCS Genie – a European malt barley being released in the U.S. through Limagrain, Genie is a short-statured two-rowed malt variety with yields similar to ABI voyager. Protein and plumps of Genie were at trial averages. LCS Genie is about 3 inches shorter than average with average lodging.

LCS Odyssey – LCS Odyssey is a European malt barley released and distributed through Limagrain Cereal Seeds. In the first year of testing, LCS Odyssey yielded very well, comparable to ABI Balster and ABI Voyager. 2016 yields were significantly higher than other varieties (Table 23). Test weights were lower and lodging was higher than average even though the variety is 3-4 inches shorter than the trial average. Heading date is three days later than average, and similar to LCS Genie. Proteins were average, and plumps were good.

LCS Vespa - a two-rowed feed barley released by Limagrain Cereal Seeds, LLC and imported from Europe. Vespa yields are greater than Champion, with lower test weights, 2-3 days later in heading date, 3-4 inches shorter, and similar for lodging.

LCS Westminster – a two-rowed feed barley released by Limagrain Cereal Seeds, LLC and imported from Europe. LCS Westminster had very high plumps and above average yields in the first year of testing (Table 23). Test weight, lodging and protein were at trial averages, and it was a little later heading and shorter than average.

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, but also doing well in irrigated southern Idaho

conditions. In southern Idaho, Lenetah has above average yield and plump, average heading date, lodging, and height. Lenetah has consistently yielded higher than Baronesse, but lower than Champion.

Merem (2Ab17271) – a two-rowed malt variety released in 2014 by the USDA-ARS in Aberdeen and the University of Idaho. Merem yields are slightly less than Copeland and Conrad, but higher than Harrington. Quality characteristics make it particularly suited for the Craft Malting Industry. Test weights, lodging, protein and plumps are average, and Merem is 2 inches taller than Harrington with less lodging.

Millennium (UT004603) – a six-row spring feed barley released in 2000 through Utah AES, Millennium does very well under irrigation, and has been in the top-yielding groups under dryland conditions when moisture was adequate. Millennium also has excellent straw strength, showing minimal lodging even under high-yield conditions. Millennium is of average height and protein, lower test weight and plump, and heads several days earlier than average.

Moravian 69 (C69) - two-rowed spring malt barley released by Coors Brewing Co. in 2005. Moravian 69 has very high yield potential, especially in the Magic Valley area where it is widely grown, and 2016 yields were very high (Table 23). M60 is short (2-4 inches below average) with low lodging. Protein is at or slightly below average in these trials. Test weight was below average.

Moravian 150 – one of two new two-rowed spring malt barley releases from the MillerCoors breeding program in Burley, Moravian 150 yields, straw strength, and grain protein are comparable to Moravian 69, but with greater test weight

Spring Barley (cont.)

and plumps. It heads three days later and is a little shorter than Moravian 69.

Moravian 169 – one of two new two-rowed spring malt barley releases from the MillerCoors breeding program in Burley, Moravian 169 straw strength, and grain protein are comparable to Moravian 69, but with slightly lower yield, very high test weight (greater than Moravian 150) and plumps. In its first year of testing, heading date was two days later than and it was a little shorter than Moravian 69.

ND Genesis (2ND25276) – ND Genesis is a two-rowed malt variety released in 2015 by North Dakota State University. In 2015, ND Genesis showed excellent resistance to foliar diseases like the spot form of net blotch (SFNB). Yields in this year's testing were low average, with good test weight, early heading, and excellent plumps. 2015 yields were at trial averages. ND Genesis is taller than average (similar to CDC Copeland and ABI Voyager) with low lodging.

Oreana (BZ509-448) – a two-rowed feed barley originally developed through WestBred, Oreana is carried by Highland Specialty Grains. In its first year of testing in these trials, Oreana had average yields, low test weight, and was 4-5 inches shorter than average. Under some highly productive environments, including 2016 trials, Oreana yields were excellent, comparable to Claymore and Vespa (Table 24). Oreana is four inches shorter than trial average, with lower protein, test weight and plump.

Quest (M122) – a six-rowed spring malt line released in 2010 for its resistance to Fusarium head blight and reduced accumulation of the DON toxin produced during the infection process. Released by the

University of Minnesota AES, it yields less than Tradition and Celebration. In Idaho, Quest yields were below average for 6-rowed malt lines, with average test weight, plumps and maturity with high lodging.

RWA1758 (RWA1758) – a two-rowed spring feed barley that is essentially a Russian Wheat Aphid resistant Baronesse developed by the USDA-ARS in Aberdeen, now handled by Highland Specialty Grains. RWA 1758 is very similar to Baronesse with greater yield potential.

Sawtooth (08ID2661) – a two-rowed, hullless spring barley released in 2015 by the USDA-ARS in cooperation with the IAES. Sawtooth is a low-phytate feed line that, like Harriman, should prove useful in animal feed to reduce phosphorus in the waste stream. Sawtooth yields were less than Baronesse in the 3-year averages, but due to its hullless characteristic, has very high test weights and protein.

Tradition – six-rowed malt released by Busch Agricultural Resources, Inc. in 2003. Tradition yields are greater than Celebration and Quest in southern Idaho, with higher test weight and plumps than test averages of other six-rowed malt lines.

Transit (03AH3054-51) – a two-rowed hullless variety released by the USDA-ARS and the University of Idaho AES in 2010 for high-beta glucan content (waxy) and intended for human consumption. Seed beta-glucan content (9-10%) 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. Yields are also greater than CDC Fibar.

Xena (BZ594-19) – a two-rowed spring feed barley released by Western Plant Breeders that is now handled by Highland

Spring Barley (cont.)

Specialty Grain. Xena has had very high yields over the locations tested from 2010-2016, similar to Champion. Its yield has been greater than Baronesse, and is about two inches taller but with similar straw strength. Test weight tends to be slightly higher than Baronesse, but less than Champion.

WINTER BARLEY

Alba (OR77) – a six-rowed winter feed and malt variety released in 2010 by the Oregon AES and the USDA-ARS. Yields over the past three years have been comparable to Eight-Twelve. Winter hardiness is above average and better than Endeavor and Charles (both are two-rowed winter malt varieties). Lodging, protein, and heading date are average, and test weight is lower than average. Alba has good resistance to foliar pathogens (stripe rust and scald).

Buck (09-OR-86) – Oregon State University hullless, six-rowed winter food barley with intermediate levels of beta-glucan content in the seed, developed for human consumption and the heart-healthy food campaign. Buck is genetically related to #STRKR with better threshability. Buck yields are low if compared to hulled varieties, but yield is still high with a high test weight (53.6 lbs/bu) due to the hullless seed (Table 6). At Rupert, Buck yields (126 bu/A with no lodging) were similar to Charles. Buck is awned and can be used as food, feed or malt. Plumps are low.

Charles (94Ab1274) – Charles is the first AMBA approved two-rowed winter malt variety released by the USDA-ARS and the IAES in 2005. Charles yields and test weights are lower than the winter feed variety average. Charles is short, early

maturing and has a tendency to lodge. Charles has excellent plumps and yields very well in the Twin Falls area, even when harsh winter conditions reduce stand. Both Charles and Endeavor can suffer significant stand losses under cold, dry winter conditions.

Eight-Twelve – a six-rowed winter feed barley released by the USDA-ARS and the Idaho AES in 1991. Eight-Twelve has high yield potential, averaging 170 bu/A under irrigation in 2014-2016, but this year's averages were lower. Winter survival and lodging is average but test weights and protein are below average.

Endeavor (95Ab2299) – Endeavor is the second two-rowed winter malt variety released by the USDA-ARS and the Idaho AES approved by AMBA for malt quality. Released in 2008, 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 good test weight and plumps, and is average for heading date, lodging and height.

Kamiak (WA2084-63) – a six-rowed feed variety released in 1971 by Washington AES. Yields and test weight are below average.

Lightning (10.0860) – Lightning is a two-rowed winter malt with facultative growth habit released from Oregon State University in 2016. In the first year of testing in southern Idaho, showed excellent yield potential in Aberdeen (averaging 166 bu/A, Table 37). Heading date was early, and height was seven inches less than average. Test weight and lodging were below trial averages.

Winter Barley (cont.)

Maja (OR81) – a six-rowed winter barley released in 2009 by Oregon AES as a winter malt variety with facultative growth habit. Yields are similar to or were greater than

Charles and Endeavor and comparable to Eight-Twelve. Maja has had average to high test weight and plumps, low protein. Maja has good winter hardiness compared to Charles and Endeavor, resistance to stripe rust, but may need fungicides when scald pressure is high.

Schuyler (NY5619B-3B) – a six-rowed winter feed barley released in 1969 by Cornell AES, yields are below average but winter survival is good for a winter barley.

Sprinter – winter six-rowed feed barley released by WestBred in 1987, Sprinter is facultative (not requiring vernalization) and can be planted in the spring. Yields of Sprinter are comparable to Eight-Twelve and Sunstar Pride, with lower test weights and plumps.

#STRKR (Streaker, OR85) – a hulless, six-rowed winter / facultative habit barley with intermediate levels of beta-glucan for food barley, Streaker was released by OSU and the USDA-ARS in 2012. Streaker yields are below the average for winter feed and malt lines, and as a hulless barley, it has a very high test weight. Streaker was average for lodging, and is also winter tender, and should be grown in the warmer areas of southern Idaho. Plumps are low.

Strider (ORW6) – a winter six-rowed feed variety released in 1998 by Oregon AES and the USDA-ARS and was developed using doubled-haploid technology. Yields have been comparable to or better than Sunstar Pride and Eight-Twelve (Table 6). Strider

has average height, lodging and protein, and low test weight.

Sunstar Pride (SDM204-B) – winter six-rowed barley released by Sunderman Breeding in 1995. Sunstar Pride consistently has been one of the highest yielding varieties in the trials, similar to Sprinter and Eight-Twelve. 2016 yields, however, were low. Test weight, and plant height are below average. Heading date is up to a week later than average, with low plumps.

Thunder (10.0777) – Thunder is a two-rowed winter malt release from Oregon State University (2016), and in the first year of testing in southern Idaho, showed excellent yield potential in Aberdeen (averaging 165 bu/A, Table 37). Heading date was early, and height was five inches less than average. Test weight was average and lodging was below trial averages.

Verdant (OR712) – an Oregon State University release in 2014, in the second year of testing in these trials. Verdant is a six-rowed, hooded, winter forage barley. Yield, test weight and plumps were low in 2015 and 2016. Verdant is licensed to Tri-State Seeds.

Wintmalt – a shorter, two-rowed winter malt developed by KWS Lochow (Germany) and imported from Europe. Wintmalt has good foliar disease resistance, is being produced in the PNW and is an AMBA approved malt variety. In the first year of production, Wintmalt heading date, lodging, protein, yields and test weight were average.

SPRING WHEAT

Alturas (IDO526) – a soft white spring wheat released by Idaho AES and USDA-ARS in 2002. Alturas has a partial waxy endosperm which may make it vulnerable to low falling numbers. Alturas is adapted to both irrigated and dryland conditions, but performs best under irrigation. It is average in yield, test weight, heading date and height. Alturas is susceptible to the current races of stripe rust and is susceptible to Fusarium head blight (FHB).

Alum – hard red spring wheat released in 2015 for tolerance to aluminum in low pH soils. In the first two years of the trials, Alum has had above average yields, similar to Bullseye for yield and test weight, but higher in protein. Alum heads about two days later than Bullseye, is three to four inches taller, and may lodge under high input production conditions. Alum has moderate resistance to moderate susceptibility to stripe rust and moderate resistance to Hessian fly. Alum would be suited for the Ashton area where acid soils are problematic, and it did well in dryland.

Alzada (YU894-75) – durum wheat released in 2004 by WestBred (a unit of Monsanto) for excellent durum quality. Alzada yields are less than the average of other locally adapted hard red and white spring wheats, with average test weight and grain protein. Alzada is very susceptible to FHB, and is susceptible to the current races of stripe rust.

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 and similar yield. Over the past three years, yield of Babe was less than UI Pettit with similar test weight. Babe is very susceptible to the

current races of stripe rust, and is moderately susceptible to FHB.

Bullseye (B02-0081) – Bullseye is a high quality hard red spring wheat released by AgriPro, now Syngenta Seeds, in 2009. Combined over irrigated locations over the past three years, Bullseye yields were slightly below average, with good test weight and average lodging. Bullseye is susceptible to the current races of stripe rust in southern Idaho, and is moderately susceptible to FHB. Bullseye is prone to suffer sprout damage if rain falls close to harvest, and will have low protein unless appropriately managed with nitrogen applied at or shortly after heading.

Cabernet (95WV10616) – a 2007 hard red spring wheat from Resource Seeds, now Syngenta Cereals, Cabernet yields are similar to Jefferson and Bullseye. Cabernet is a little shorter than average, (2 inches shorter than Bullseye), has average test weight, and like Bullseye, may have lower protein unless appropriately managed with nitrogen applied at or shortly after heading. Cabernet was moderately resistant to the local 2016 race of stripe rust, and moderately susceptible to FHB.

Dayn (WA8123) – Dayn is a hard white spring wheat released in 2012 by Washington AES and the USDA-ARS, and being handled in southern Idaho through Syngenta Cereals. Dayn was the highest yielding spring wheat over the past four years of the irrigated trials. Test weight is good and heading date was average. Protein was a little below average. Dayn was 2-3 inches taller than average but has good lodging resistance. End use quality is acceptable. Dayn is resistant to stripe rust and among the “least susceptible” hard white spring wheat for FHB.

Spring Wheat (cont.)

Diva (WA008090) – a 2010 release from the Washington AES, Diva is a soft white spring wheat having Hessian Fly resistance, high-temperature adult plant resistance to stripe rust (is moderately resistant) and good end-use quality. Diva yielded greater than UI Pettit in 2016 (Table 21), and is susceptible to FHB.

HRS 3419 – one of four hard red spring wheats from Winfield Solutions, LLC, a Land O'Lakes Company, HRS 3419 has been tested for three years in these trials. (HRS 3419 was listed as LL3419 in the 2014 SGR.) Yield, test weight and grain protein is below average. HRS 3419 headed about three days later than Jefferson, is moderately resistant to moderately susceptible to stripe rust and was the least susceptible hard red spring wheat in 2015 FHB testing.

HRS 3504 – a hard red spring wheat from Winfield Solutions, LLC, tested for two years in these trials. HRS 3504 was the highest yielding hard red spring wheat in the 2015 irrigated trials, but yields were below average in 2016 (Table 20) due to susceptibility to stripe rust. HRS 3504 had lower grain protein than irrigated average. HRS 3504 is among the least susceptible hard red spring wheats in the 2015 FHB testing.

HRS 3530 – one of four hard red spring wheats from Winfield Solutions, LLC, a Land O'Lakes Company, tested in 2015 and 2016 in these trials. HRS 3530 had lower than average yields and test weight under irrigation, due to it being very susceptible to stripe rust. All the HRS lines were taller in height, with HRS 3530 being five inches taller than average. HRS 3530 also had lower levels of grain protein.

HRS 3616 – hard red spring wheat in its first year of testing in these trials. HRS 3616 is one of four hard red spring wheats from Winfield Solutions, LLC, a Land O'Lakes Company. Yields were low in 2016 due to it being very susceptible to stripe rust, test weight was good, and protein was above average (which could be the result of lower yielding wheat due to stripe rust and having extra available soil nitrogen contributing to grain protein instead of yield).

Jefferson (IDO462) – hard red spring wheat released by Idaho AES and USDA-ARS in 1998. Jefferson is primarily intended as a dryland variety due to it being taller than average and susceptible to lodging under irrigation. Irrigated and dryland yields have been at or below test averages. Jefferson has good quality when there is adequate soil nitrogen and sulfur, and when there's a minimum of 13 percent grain protein. Jefferson is susceptible to the current races of stripe rust and to FHB, but resistant to Hessian Fly.

Kelse (WA007954) – a hard red spring wheat released in 2008 through the Washington AES, and the USDA-ARS. Kelse is taller than average under irrigation with lower yield (Table 9), while test weight and protein are higher than average. Kelse has seedling and adult plant resistance (HTAP) to stripe rust but is susceptible to the current races. Kelse is Hessian Fly resistant, but is susceptible to FHB.

Klasic (NK77S1817) – a well-established hard white spring wheat with exceptional quality characteristics. Klasic was released in 1982 by Northrup-King, and while yields in the extension trials are low, yields can be excellent with appropriate irrigation practices. Klasic is average for test weight, 5-6 inches shorter than average, and is

Spring Wheat (cont.)

earlier in heading and maturity. Klasic is very susceptible to stripe rust, FHB and Cereal Cyst nematode. While in certain years, FHB symptom development may be low due to earlier heading, the DON toxins from FHB can be high, as in 2016 trials. Triazole fungicides applied at flowering are highly recommended as a standard practice in growing Klasic.

LCS Atomo (06SB086-B) – a newly released hard white spring line imported from Europe by Limagrain Cereal Seeds. LCS Atomo was tested for the first time in these trials in 2014, and had average yield and lodging (see Table 9). LCS Atomo is short with earlier maturity (comparable to Klasic), but with lower test weight and grain protein than average. LCS Atomo is moderately susceptible to current races of stripe rust, and susceptible to FHB.

LCS Iron (11SB0096) – a 2015 release from Limagrain Cereal Seeds, LCS Iron is a high-yielding hard red spring wheat that has been in these trials for three years. Yields were similar to WB9411, with lower test weight, about 1-3 days later in heading, and 1-2% lower in grain protein. LCS Iron is resistant to current races of stripe rust. LCS Iron was among the least susceptible hard red spring wheat to FHB. Top-dressing nitrogen at flowering is recommended to achieve hard red spring wheat targets.

LCS Luna (10SB0087-B) – a 2016 release from Limagrain Cereal Seeds, LCS Luna is a medium maturity hard red spring wheat that has performed well under limited rainfall areas of Washington (12-16" of annual rainfall). Tested for two years in southern Idaho trials, Luna performed above average for yield in 2015 at Soda Springs, and below average under combined irrigated

trials. In 2016 irrigated trials (Table 20), LCS Luna was average for lodging, yield and test weight, shorter than average by two inches, three days later than average for maturity and slightly below average for grain protein. LCS Luna was resistant to stripe rust, and among the less susceptible of the hard white springs to FHB (Addendum 4 and 5).

LCS Star – a hard white spring wheat imported from Europe by Limagrain Cereal Seeds. LCS Star had above average yield, average grain protein, plant height and lodging, and lower test weight (Table 9). Grain quality is good. LCS Star is moderately resistant to local races of stripe rust, and, like all currently-available hard white spring wheats, is susceptible to FHB.

Louise (WA7921) – soft white spring wheat released in 2004 from Washington State University's spring wheat breeding program and used as a long-term check for soft white spring wheat. Louise is a later maturity, tall soft spring wheat with below average yields with high lodging potential under irrigated conditions. Louise is susceptible to stripe rust.

Melba (WA8193) – a soft white spring club wheat released in 2016 by Washington State Ag Experiment Station with higher yield potential and lower grain protein than JD. Melba is shorter than JD and stands better under irrigation. Melba is resistant to stripe rust.

Seahawk (WA8162) – a newly released soft white spring wheat from Washington State University's spring wheat breeding program adapted to dryland and irrigated production areas. Seahawk has resistance to Hessian fly, is very resistant to stripe rust, and one of the least susceptible soft white spring wheats to

Spring Wheat (cont.)

FHB. Seahawk has tolerance to high aluminum, low pH soils. Yield and test weight has been one the highest of all currently available soft white springs, with slightly less yield than UI Stone and WB6430. Plant height is average and heading date 1 day later than average. Seahawk may have a tendency to lodge under high production practices.

Snow Crest (BZ904-331WP) – a 2004 release by the WestBred program, (now a unit of Monsanto), Snow Crest is a high quality hard white spring wheat typically with higher yields than Klasic and similar grain protein. Test weight is average, but similar to Klasic, and it is earlier maturing and a little shorter than average. Snow Crest is very susceptible to stripe rust and FHB.

SY Basalt (04W40240R) – a hard red spring wheat released in 2014 by Syngenta Seeds, SY Basalt has high yield potential under high input environments (Tables 20, 39), comparable to LCS Iron. In the third year of extension testing, SY Basalt had high yields, but lower test weight and protein. SY Basalt was not tested at the Ashton location, resulting in higher yields in Table 20 of irrigated averages. Maturity is about 3-5 days later than average. SY Basalt is moderately resistant to current races of stripe rust and susceptible to FHB.

SY Coho (SY40292R) – released in 2015 by Syngenta Cereals, SY Coho has been tested in these trials for three years (see Table 9, but SY Coho was not included in the lower yielding irrigated site of Ashton). SY Coho is a hard red spring wheat with average yields, but having lower than average test weight and average protein. SY Coho suffers yield loss if irrigation is lower than needed late in the growing season (as in

the Idaho Falls irrigated location). SY Coho is moderately resistant to susceptible to stripe rust and susceptible to FHB.

SY Saltese (SY3024-2) – a soft white spring wheat released in 2016 by Syngenta Cereals. SY Saltese has yield potential similar to Seahawk. Averaged over three irrigated locations, SY Saltese yielded 120 bu/A while Seahawk yielded 121 and WB6430 125 bu/A. In the first year of testing, SY Saltese also had very good test weight and resistance to stripe rust, but high lodging (see Table 10, but SY Saltese was not included in the lower yielding irrigated site of Ashton).

SY Selway (SY3001-2) – 2015 release from Syngenta Cereals, SY Selway is a hard red dryland spring wheat that in the second year of extension testing yielded slightly above average with average test weight and protein (Table 42). SY Selway was similar to Kelse in many agronomic characteristics, but was a percentage lower in protein. SY Selway was susceptible to FHB (under the irrigated, inoculated FHB screening trial at Aberdeen), but under dryland conditions, FHB should not be problematic. SY Selway should have good resistance to stripe rust.

SY Teton (SY10136) – Syngenta Cereals released this hard white spring wheat in 2015. In the past three years, SY Teton was one of the highest averaging for yield of the hard white and hard red spring wheat group (Table 9, 20 but SY Teton was not included in the lower yielding irrigated site of Ashton). SY Teton was comparable to Dayn but with lower test weight. Heading date is very early, and it is 3-4 inches shorter than Dayn. Grain protein is less than average and less than Dayn. Reaction to head blight was similar to Dayn, which was less susceptible than the majority of hard white spring wheat

Spring Wheat (cont.)

varieties. SY Teton is moderately susceptible to stripe rust.

Tekoa (WA8189) – a Washington State 2016 release, Tekoa is a soft white spring wheat released for higher rainfall areas and will do well under irrigated conditions. Tekoa did not yield as well in areas where irrigation was restricted at the end of the growing season. Tekoa is adapted to low pH soils where aluminum toxicity can occur. Tekoa has high test weight and is a little later in maturity (heading date) than average. Tekoa is resistant to stripe rust.

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 shorter and heads 3-5 days earlier than Alturas. UI Pettit is very susceptible to current races of stripe rust and to FHB.

UI Platinum (IDO694C) – a University of Idaho and IAES hard white spring wheat, UI Platinum is a high yielding hard white spring wheat with average test weight and lodging. Over the last three years, yield has been comparable to red wheats WB9411 and Cabernet, but less than Dayn (W). In some environments, UI Platinum will show dark chaff discoloration similar to black chaff infection, which is not a disease but a genetic trait. UI Platinum is susceptible to current races of stripe rust and susceptible to FHB.

UI Stone (IDO599) - a soft white spring wheat released by Idaho AES in 2012, UI Stone has high yield potential, consistently greater than UI Pettit and Alturas. UI Stone was selected for reduced FHB susceptibility, carries the Fhb1 resistance gene and is the one of the soft white spring wheats in the

PNW that should be grown following corn (if wheat is the only choice available to follow corn). UI Stone also has tolerance (not resistance) to Cereal Cyst Nematode, and is susceptible to the current races of stripe rust. Grain protein, height and lodging are average.

WB-1035CL+ – a soft white spring wheat released by WestBred (a unit of Monsanto) in 2015, is a two-gene Clearfield line. Clearfield wheats have resistance to imazamox herbicides such as to Beyond® herbicide for hard-to-control grassy weeds. Planting spring wheat with the Clearfield technology is advantageous following Clearfield winter wheat varieties where Beyond herbicide was applied due to potential herbicide carryover in the soil. Released for dryland production, yield under irrigated conditions is low. WB-CL+ is very susceptible to stripe rust.

WB6121 – soft white spring wheat released by WestBred (a unit of Monsanto) in 2015 intended for irrigated production areas. WB6121 has a Nick background but has good resistance to stripe rust. WB6121 had excellent test weight, with better yield than Alturas. It is 3 inches shorter than average and about two days earlier in heading than average.

WB6430 (BZ608-125) – a soft white spring wheat released by WestBred (a unit of Monsanto) in 2014. WB6430 is a UI Pettit-type of soft white spring wheat with very high yield potential, good test weight, and resistance to stripe rust. Maturity is slightly earlier than average, but 3 days later than UI Pettit. WB6430 is also 3 inches shorter than average. WB6430 is moderately resistant to stripe rust and susceptible to FHB.

Spring Wheat (cont.)

WB7328 – most similar to Snow Crest, WB7328 is a hard white spring wheat with similar agronomic characteristics as Snow Crest, but is about one inch shorter. Released in 2015 by WestBred (a unit of Monsanto) as a Snow Crest replacement, WB7328 has better resistance to stripe rust and higher yield potential. In 2016, a year with high stripe rust pressure, WB7328 showed some susceptibility to stripe rust. Like all hard white spring wheat, WB7328 is susceptible to FHB.

WB7589 – a short-statured, hard white spring wheat most similar to Klasic in agronomic and end-use quality. WB7589 was released in 2015 by WestBred (a unit of Monsanto) as a replacement for Klasic, having better resistance to stripe rust and higher yield potential. WB7589 yielded similar to UI Platinum in 2015 and 2016 trials. Under heavy pressure, WB7589 was moderately resistant to stripe rust in 2016. Like all hard white spring wheat, WB7589 is susceptible to FHB.

WB9200 – a hard red spring wheat released by WestBred (a unit of Monsanto) in 2016 and tested for the first time in these trials in 2016. WB9200 was released for irrigated and high rainfall production areas. Irrigated yield was above average with excellent test weight and high protein. WB9200 is moderately resistant to stripe rust.

WB9377 – hard red spring wheat released by WestBred (a unit of Monsanto) in 2016 intended for irrigated production areas. WB9377 was tested for the first time in these trials in 2016, and had lower than average yields, but good test weight and grain protein. WB9377 was moderately susceptible to stripe rust in 2016 under heavy stripe rust pressure.

WB9411 (BZ908-418) – hard red spring wheat released by WestBred (a unit of Monsanto) in 2014 intended for irrigated and high rainfall production areas. WB9411 was similar in yield to LCS Iron with significantly higher grain protein (Table 9, 20). Test weight, heading date and plant height were at trial averages. End-use (baking) quality is excellent. WB9411 is resistant to current races of stripe rust, and one of the least susceptible of the hard red springs to FHB.

WB9518 – hard red spring wheat released by WestBred (a unit of Monsanto) in 2016 intended for irrigated and high rainfall production areas, and agronomically similar to WB9411. Yields were less, and heading date was three days later, but protein was higher than WB9411. WB9518 was very resistant to stripe rust in 2016.

WB9668 (BZ908-552) – a hard red spring wheat intended as a replacement for WestBred 936, WB9668 was tested in the trials for the first time in 2014. Three-year data shows WB9668 to be slightly higher than average for yield with excellent grain protein. WB9668 is 2 inches shorter than average with high test weight, lower lodging and an average heading date. WB9668 is very resistant to the current races of stripe rust and intermediate in susceptibility to FHB. WB9668 is also among the most resistant hard red spring wheats for cereal cyst nematodes (CCN).

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, WB-Paloma had yielded comparable to UI Platinum under irrigation, yielding 107% of Snow Crest and 111% of Klasic. Under high production conditions,

Spring Wheat (cont.)

WB-Paloma has high yield potential and high protein, and is average for height and test weight. WB-Paloma is very susceptible to the current races of stripe rust and is susceptible to FHB.

WINTER WHEAT

Bearpaw (MTS0721) – a hard red winter released in 2011 by the Montana AES for dryland wheat production. Bearpaw is an awned, white-glumed, semi-dwarf with solid stems. As a result of the solid-stem characteristic, Bearpaw has resistance to cutting by the wheat-stem sawfly at levels similar to Judee. Bearpaw is resistant to stem rust, but very susceptible to stripe rust. Yields of Bearpaw were below average in the dryland conditions in southern Idaho (Table 7) and test weight was average. Bearpaw is susceptible to dwarf bunt (DB).

Bobtail (OR208047P4) - a 2012 release from Oregon State University and the USDA-ARS, Bobtail is a soft white winter wheat with excellent yield potential, good lodging tolerance, and disease resistance. Test weight of Bobtail was low, however, and lodging, protein and height were average over three years in the (Table 5) irrigated trials. Heading date was about two days later than average. Bobtail is susceptible to dwarf bunt (DB), and resistant to stripe rust.

Brundage (ID86-14502B) – a soft white winter wheat released in 1996 by the Idaho AES. Irrigated yield potential of Brundage is excellent, as is the end use quality. Yields in the last three years have been 90% of average as Brundage is very susceptible to several diseases, including stripe rust, dwarf bunt and Cephalosporium stripe. In 2016, stripe rust reduced Brundage yield

significantly – by as much as 50% or greater of expected (Table 33). Brundage yielded 53 bu/A compared to 185 bu/A of WB1783 and 160 bu/A for SY Ovation.

Bruneau (93-64901A) – soft white winter wheat released in 2009 by the University of Idaho AES. Bruneau has been a very high yielding variety, but performed poorly in 2016 compared to past years. Bruneau had about average for yield over the past three years, comparable to WB1529 and LCS Artdeco. Bruneau is taller than average and may lodge under high production conditions, is moderately resistant to stripe rust, and has good end use quality, and low protein. It is moderately susceptible to dwarf bunt.

Colter (MT08172) – a hard red winter variety released in 2014 by Montana State University for dry land production. Colter yielded well under irrigated conditions in the Kimberly area, and does well under limited irrigation and dry land conditions. In 2015, Colter yielded very well in Soda Springs, with higher test weight and grain protein than the average for this location. Colter is moderately susceptible for dwarf bunt, and showed very little to no symptoms of physiological leaf spot (see Addendum 2 of 2015 SGR). Colter is susceptible to stripe rust, and yields and test weight were reduced at Aberdeen in 2016 due to heavy disease pressure (Table 27).

Curlew (UT9325-55) – a hard red winter wheat released by the Utah AES for the dryland production areas of southern Idaho and Northern Utah in 2009. Curlew yields are comparable to Yellowstone and Utah 100 under dryland conditions and is agronomically similar to Utah 100 with medium maturity, and an inch taller with better test weight. Curlew is very resistant to dwarf bunt, and is moderately resistant to stripe rust.

Winter Wheat (cont.)

Deloris (UT2030-32) – a very high end-use quality hard red winter variety for dryland production. Deloris was released in 2002 by the Utah AES and yields well under dryland conditions when stripe rust is absent. Winter survival, grain protein, test weight and height are average. Deloris is very susceptible to stripe rust and very resistant to dwarf bunt.

Eltan (WA7163) – soft white winter wheat released in 1990 by the Washington AES. Eltan has wide adaptability in the dryland production areas with good snow mold tolerance and resistance to dwarf bunt. Yields are below average in dryland trials. Eltan will lodge under irrigation and is one of the latest varieties for heading date, but is still a good choice for dry land production areas. Under heavy stripe rust pressure this year, Eltan was susceptible to stripe rust.

Garland (UT1706-1) – released in 1992 by the Utah AES, Garland is a hard red winter wheat favored for its short stature under irrigation. Yield potential and test weight under irrigated and dryland conditions is below average, and end-use quality is poor. Garland is very susceptible to stripe rust, PLS, and many soil-borne diseases but is resistant to dwarf bunt.

Golden Spike (UT1944-158) – a 1999 release from Utah AES for dry land production, Golden Spike is a hard white winter wheat with a partial waxy endosperm. Golden Spike will lodge under irrigation. Under dryland conditions, Golden Spike's plant height, test weight and yields are below average, with low grain protein. Golden Spike is very resistant to dwarf bunt, and is susceptible to stripe rust.

Greenville (UT9743-42) – Utah AES released Greenville hard red winter wheat in 2010 for irrigated production. Greenville has good yield potential under irrigation, and was average under dryland conditions. Three-year averages for 2014-2016, irrigated yields of Greenville were at trial average (Table 4). Test weight, plant height and lodging were below average. Heading date and grain protein were average. Greenville is moderately resistant to moderately susceptible (under heavy pressure) to stripe rust and has dwarf bunt resistance.

Jasper (WA 8169) – the soft white winter wheat WA8169 is now named Jasper and was officially released by the Washington State AES and the USDA-ARS in 2015. It is a mid-maturity line with good cold tolerance, stripe rust resistance, eyespot foot rot resistance, and very good end-use quality. It is broadly adapted with yields comparable to WB 528 but with lower test weight. Jasper seems to adapt very well to high rainfall and irrigation and does very well when water becomes limited later in the season. Jasper was better than Eltan for snow mold resistance, is resistant to moderately resistant to stripe rust, but is very susceptible to dwarf bunt.

Judee (MT0713) – a hard red winter released in 2011 by Montana State AES, Judee is a solid stem semi-dwarf with resistance to the wheat stem sawfly. Lodging under irrigation is high, comparable to Yellowstone, so Judee is recommended for dry land production. Dry land yields are comparable to Utah 100. Judee is the inches shorter than Utah 100, with average heading date with above average grain protein and test weight. Judee is susceptible to dwarf bunt and moderately resistant to stripe rust.

Winter Wheat (cont.)

Juniper (IDO 575) – hard red winter wheat released in 2005 by the Idaho AES for dry land production areas. Juniper has moderate yield potential under irrigation, is extremely tall and will lodge. Juniper has very good test weight and protein. Juniper performs well under dryland conditions, similar to UI SRG, and is very resistant to dwarf bunt and moderately resistant to stripe rust.

Keldin (ACS55017) – a hard red winter wheat distributed by WestBred (a unit of Monsanto), Keldin had the highest average yield of the hard red winter wheat tested in these trials from 2012-2015, and is still in the highest yielding group (Table 4). Comparable to Yellowstone and Norwest 553, yields are excellent under irrigated and dryland conditions (Table 28, 30). Keldin is a little shorter to average for height, has very high test weight (see Table 4) and is a little below average for grain protein. Keldin is susceptible to dwarf bunt and in 2016 was moderately susceptible to susceptible to current races of stripe rust.

LCS Artdeco (NSA06-2153A) – Limagrain Cereal Seeds introduced several European lines into the US in 2011, including LCS Artdeco, a soft white winter wheat. In the third year in the trials, LCS Artdeco yields were similar to WB 528. While yields were average, the test weight was below average, and height was 1-2 inches shorter than average. LCS Artdeco is moderately resistant to moderately susceptible to stripe rust, and very susceptible to dwarf bunt.

LCS Biancor – soft white winter carried by Limagrain Cereal Seeds, and in the third year of testing yielded similar to WB 528 under irrigation (Table 5), but with lower test weight. LCS Biancor's test weight and proteins were below average, and it was 4-5

inches shorter than average. LCS Biancor is susceptible to dwarf bunt, but very resistant to stripe rust.

LCS Colonia – a German hard red winter with good winter hardiness, LSC Colonia was introduced by Limagrain Cereal Seeds in 2013. Yields in these trials have been at nursery average with very low test weight (Table 4, 17). Plant height and protein were below average, and maturity (heading date) was four days later than trial average. It is susceptible to dwarf bunt but very resistant to stripe rust.

LCS Drive (LWW12-7105) – a 2015 release from Limagrain Cereal Seeds, LCS Drive is a soft white winter wheat in its third year of testing. Yields were similar to SY Ovation and Bobtail (Table 5) and in 2016 were well above average (Table 18). LCS Drive has low test weight and runs 3-5 inches shorter than average with excellent straw strength. Proteins were below average. LCS Drive is susceptible to dwarf bunt, but should be grown under irrigated conditions where dwarf bunt pressure is low. LCS Drive was very resistant to 2016 races of stripe rust.

LCS Jet (NSA 7208) – a hard red winter with released in 2015 by Limagrain Cereal Seed, LCS Jet has excellent yield potential (Table 4, 17) and has been the top yielding hard red winter for the previous three years of irrigated testing. It was above average for 2015 dry land yield and was the top yielding variety in Rockland dry land trial (Table 29). Test weight, grain protein and lodging has been below average, and LCS Jet has been 2-4 inches shorter than average. LCS Jet is very susceptible to dwarf bunt and moderately resistant to stripe rust.

Winter Wheat (cont.)

Loma (MTS1224) – Loma is a hard red winter wheat released from Montana State 2016. Loma did well under irrigated conditions (Table 17) and in Kimberly trials, with yields comparable to Keldin, Whetstone and Yellowstone. Test weight, protein and plant height were average. Loma was later than average for heading date and was high in lodging. Loma is susceptible to dwarf bunt and seed should be treated to reduce smut under conditions where dwarf bunt is endemic. Loma was moderately susceptible to stripe rust under high disease pressure. Dryland yields were best under higher rainfall locations.

Lucin-CL (UT89099) – Utah AES released this hard red winter single-gene 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 is susceptible to dwarf bunt and will show severe symptoms of physiological leaf spot under dry land conditions. Lucin-CL is very susceptible to stripe rust and to dwarf bunt. Dry land yields have been similar to Deloris.

Madsen (WA7163) – a soft white winter wheat originally released in 1988 jointly by Washington, Idaho and Oregon AES, Madsen has wide adaptability in the PNW with overall good disease resistance. Madsen yields and test weight are below average under irrigation, comparable to Stephens, it is 4-5 days later in heading date, and 2-3 inches taller. Yields are greater than average under dryland conditions. Madsen is moderately susceptible to dwarf bunt. Under high stripe rust pressure in 2016, Madsen was moderately susceptible to stripe rust.

Manning (UT89099) – a 1979 release from Utah AES, Manning is a hard red winter wheat with below average yields and high lodging under irrigation. Yields under dryland conditions have been average, but Manning is very resistant to dwarf bunt and moderately resistant to moderately susceptible to stripe rust.

Northern (MT0978) – MSU 2015 release, Northern is a hard red winter wheat in the second year of these trials. Northern yields were at to below average and similar to Utah 100, with low test weight. Heading date was 4-5 days later than trial average, it was two inches taller than average and had average protein. Dry land yield was at average. Northern is very susceptible to dwarf bunt and moderately resistant to moderately susceptible to stripe rust.

Norwest 553 (ORN00B553) – a hard red winter wheat released by Oregon State in cooperation with the USDA-ARS and developed by Nickerson U.K. Norwest 553 is resistant to stripe rust and tolerant to Fusarium crown rot, and has yielded very well (Table 4) under irrigation, comparable to Keldin and Yellowstone. Norwest 553 is 5 inches shorter than average with excellent lodging resistance and good test weight. Grain protein was average. Winter hardiness is a problem in some years especially when entering the winter under dry conditions, and Norwest 553 is susceptible to dwarf bunt but very resistant to stripe rust.

Norwest Duet (LOR-092) – Norwest Duet was released in 2015 by Oregon State University jointly with Limagrain Cereal Seeds. It is a very tall soft white winter wheat that in 2015 performed at trial average for yield and below for test weight. Heading date was five days later than average for the trial. Grain protein was slightly above average. Norwest Duet is

Winter Wheat (cont.)

moderately resistant to dwarf bunt and resistant to stripe rust.

Norwest Tandem (LOR-334) – a soft white winter wheat that was released in 2016 by Oregon State University jointly with Limagrain Cereal Seeds, LLC. Norwest Tandem yields were above average in 2016, similar to WB528, but with lower test weight, and two days later in heading date with stronger straw strength. Dry land yields were at trial averages. Norwest Tandem is susceptible to dwarf bunt, with good resistance to stripe rust.

Otto (WA008092) – a soft white winter released September 2011 by Washington AES, Otto is similar agronomically to Eltan and a day later in heading than Eltan, about four days later than average. Otto has higher yield potential than Eltan, similar to Madsen with better test weight than Eltan. Otto will have similar snow mold tolerance to Eltan and also is resistant to dwarf bunt.

Promontory (UT1567-51) – a hard red winter wheat released by Utah AES in 1990. Promontory is a dryland variety with good test weight. Yield under irrigation has been above average, but it will lodge. Promontory has short coleoptiles and may have trouble emerging when planted deep in dry soils. Promontory is resistant to dwarf bunt and moderately susceptible to stripe rust.

Stephens (OR65-116) – a 1977 soft white winter release from Oregon AES, Stephens is still widely grown in southern and southwestern Idaho. Yield and test weight under irrigation are average. Stephens heads about two days earlier than average and has a little higher protein. Quality is poor. Stephens is moderately susceptible to dwarf

bunt, does not have good resistance to snow mold, and is susceptible to stripe rust.

SY107 (03PN108#21) – a soft white winter wheat developed and released by Syngenta Cereals, SY 107 was been tested in the irrigated trials (2015), with slightly above average yields in 2015, and excellent yields in 2014. Test weight has been at average, with 1 day later heading date than SY Ovation and similar plant height. In the 2016 dryland trials, yield and test weight were below trial averages. SY 107 was moderately resistant to moderately susceptible to dwarf bunt and is not snow mold tolerant.

SY Assure (SY 96-2) – a soft white winter wheat released in 2016 by Syngenta Cereals, yield in 2016 irrigated trials was comparable to SY Ovation (Table 18) with very good test weight. Heading was earlier than the trial average by 5 days, and three days earlier than WB-528. SY Assure is moderately resistant to moderately susceptible to dwarf bunt, and resistant to stripe rust.

SY Clearstone 2CL (MT CL1077) – a hard red winter 2014 release by Syngenta, SY Clearstone 2CL is a two-gene Clearfield line agronomically similar to Yellowstone. Clearfield wheats have resistance to imazamox herbicides such as to Beyond® herbicide for hard-to-control grassy weeds. Under dryland conditions yields were excellent, similar to UI Silver and Yellowstone. Under irrigation, SY Clearstone 2CL yields were less than average in 2015 and 2016. Like Yellowstone, SY Clearstone 2CL is taller than average and may lodge. SY Clearstone 2CL is moderately susceptible to dwarf bunt, and resistant to stripe rust.

Winter Wheat (cont.)

SY Ovation (03PN108#21) – a soft white winter wheat released by Syngenta Cereals in 2011. SY Ovation has had excellent yields over the past four years, similar to Bobtail with much better test weight. Heading date, height, lodging and protein were average, with higher than average test weight (see Table 5). SY Ovation is moderately resistant to current races of stripe rust and susceptible to dwarf bunt.

SY Touchstone (W) (04PN028B-3) – SY Touchstone is a hard white winter wheat short that performed similar to Norwest 553 in 2016 irrigated trials (Table 17). Released by Syngenta Cereals in 2016, SY Touchstone is shorter in plant height than Keldin with good straw strength and protein. It is susceptible to dwarf bunt and resistant to stripe rust.

UI Castle CLP (IDN 09-DH10) – UI Castle CLP is a soft white winter wheat and is a two-gene Clearfield line. Clearfield wheats have resistance to imazamox herbicides such as to Beyond® herbicide for hard-to-control grassy weeds. UI Castle CLP was released in 2015 as a joint release from the Idaho AES and LCS seeds, and in the second year of testing, the irrigated yields were below average. It was four days later in heading than average, six days later than WB-528 and eight days later than WB456. Test weight of UI Castle was average, and dryland yields were average. UI Castle is resistant to stripe rust, and moderately susceptible to dwarf bunt.

UI Magic CLP (IDN 09-DH11) – UI Magic is a soft white winter wheat and is a two-gene Clearfield line. Clearfield wheats have resistance to imazamox herbicides such as to Beyond® herbicide for hard-to-control grassy weeds. UI Magic was released in

2015 as a joint release from the Idaho AES and LCS seeds. Yield in 2015 and 2016 was below trial average (Table 18). Test weight, heading date and lodging are at trial averages. UI Magic is susceptible to stripe rust and to dwarf bunt.

UI Palouse CLP (IDN 3_5_10) – UI Palouse CLP is a soft white winter wheat and is a two-gene Clearfield line. Clearfield wheats have resistance to imazamox herbicides such as to Beyond® herbicide for hard-to-control grassy weeds. UI Palouse CLP was released in 2015 as a joint release from the Idaho AES and LCS seeds. Irrigated yields in 2016 were between UI Castle CLP and UI Magic CLP. UI Palouse is moderately resistant to moderately resistant to stripe rust, and very susceptible to dwarf bunt.

UI Silver (IDO658B) – a hard white winter wheat released in 2011 by the University of Idaho AES. UI Silver yields very well under dry land conditions with excellent test weight (Table 7). UI Silver has good end use quality for both bread and Asian noodles. UI Silver has resistance to stripe rust (high temperature adult plant or HTAP), dwarf bunt, and carries the SrTnp gene for resistance to stem rust. It is susceptible to black chaff and lodging, which can be a problem under irrigation. Like Golden Spike, UI Silver is a partial waxy winter wheat. UI Silver is very resistant to dwarf bunt and moderately resistant to stripe rust.

UI Sparrow (IDO1108) – a new release from the University of Idaho, UI Sparrow is a soft white winter wheat with high yield potential in dryland production. UI Sparrow is adapted to both irrigated and dryland production systems, but has a higher tendency to lodge under irrigated production. Irrigated conditions in 2015 were more favorable for high yield of UI

Winter Wheat (cont.)

Sparrow than 2016. UI Sparrow is very resistant to dwarf bunt, which is a huge benefit under organic production systems. It is also moderately resistant to stripe rust, similar to SY Ovation, and in most years will not need fungicides in dryland conditions to control stripe rust.

UI SRG (IDO656B) – a hard red winter wheat released in 2012 by the Idaho AES for the dryland conditions of southern Idaho and Northern Utah. SRG will lodge under irrigation without the use of growth regulators. Yields in the past three (very stressful) years have been at dryland average, comparable to Juniper. UI SRG is very resistant to dwarf bunt and resistant to stripe rust.

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 (one-gene imi) such as Beyond®, and will be useful in areas where jointed goatgrass and cheatgrass are problems. Yields are comparable to Golden Spike but with much higher protein. UICF Grace is tall and susceptible to black chaff, making it suited to dryland production. UICF Grace is resistant to dwarf bunt but susceptible to stripe rust.

UI-WSU Huffman (IDN-03-29902A) – a soft white winter released by the Idaho AES northern breeding program jointly with WSU in honor of Brad Huffman. Yields in southern Idaho under irrigation have been comparable to WB 456 and better than Brundage (Table 5), with low test weight, later heading, and taller with greater tendency to lodge. UI-WSU Huffman is susceptible to dwarf bunt, not snow mold

tolerant, and moderately resistant to stripe rust.

Utah 100 (UT1650-150) – a hard red winter wheat released in 1997 by the Utah AES. Utah 100 has consistently done well under both irrigated and dryland conditions for yield, and as a dry land variety may lodge under irrigated conditions. Utah 100 is very resistant to dwarf bunt and is moderately susceptible to current races of stripe rust.

Warhorse (MT) – Warhorse is a 2014 release from Montana AES. Warhorse is a hard red winter wheat adapted to dry land conditions, having below average yields in 2015, above average in 2016 and with good protein. Test weight was a little above average. Warhorse is a solid-stemmed wheat resistant to the wheat stem sawfly. Warhorse is susceptible to dwarf bunt, and moderately resistant to moderately susceptible to stripe rust.

WB 456 (BU6W99-456) – a soft white wheat released by WestBred (a unit of Monsanto) in 2008 as an improvement over WB 470 and as a replacement for WB 528. WB 456 has been consistent in yield, yielding less than WB 528 in the past four years with higher test weight. Yields have been below irrigated trial averages. WB 456 is a little shorter than average, with good straw strength, and earlier heading (about 5 days earlier than average). It is moderately resistant to stripe rust, but susceptible to dwarf bunt.

WB 528 (BZ6W98-528) – soft white winter wheat released in 2005 by WestBred (a unit of Monsanto) with good yield potential under irrigation. Three year average yields and test weight were above trial average (Table 5), with average grain protein. Plant height and lodging were slightly above average. WB 528 is moderately susceptible

Winter Wheat (cont.)

dwarf bunt and moderately resistant to stripe rust.

WB1376CLP (WB-1038CL) – soft white winter WestBred to be released in 2015, WB1376CLP is an imi-tolerant, soft white winter wheat, containing two genes for tolerance to BASF’s grass herbicide ‘Beyond’®. In the first two of trials, yields were below average with excellent test weights (Table 4 and 35). Irrigated yields in 2016 were similar to WB 456 (Table 18). Height is 2 inches taller than average and 2 inches taller than WB 528, and WB1376CLP is susceptible to dwarf bunt, and moderately resistant to stripe rust.

WB1529 (BZ6W07-436) – soft white winter released in 2014 by WestBred (a unit of Monsanto), yields of WB1529 under irrigation are similar to WB 528 in 2015 and 2016 (Table 5 and 18), with higher test weight and similar lodging potential. Grain protein was at nursery averages. WB1529 is resistant to current races of stripe rust and resistant to dwarf bunt.

WB1783 (BZ6W09-471) – a high yielding soft white winter wheat released in 2015 by WestBred (a unit of Monsanto). Irrigated yield in 2016 averaged higher than SY Ovation, similar to LCS Drive and SY Assure, with excellent test weight and good straw strength (Table 18). WB1783 is very resistant to stripe rust and to dwarf bunt.

WB3768 (W) (MTW08168) – hard white winter wheat released in 2015 with excellent yield potential, yielding 106% of Golden Spike under irrigation with higher grain protein and significantly less lodging, even though plant height was 6 inches greater than average and 3 inches greater than Golden Spike (2015 SGR). Under dry land

conditions in 2016, it was agronomically similar to SY Clearstone 2CL, though yielding a little less (Table 16). WB3768 is moderately resistant to moderately susceptible to both dwarf bunt and stripe rust.

Whetstone (W98-355) – is a hard red winter wheat from AgriPro, now Syngenta Cereals, released in 2009. Whetstone is a medium height semi-dwarf with buckskin colored chaff at maturity. Whetstone is an early-maturing wheat heading six days earlier than trial averages (Table 4). Whetstone has a good level of winter-hardiness but is moderately susceptible to the current prevalent races of stripe rust (2011 and 2016). Yield in the past three years has been average (Table 4), with good test weight and grain protein with very good loaf volume. Whetstone is very susceptible to dwarf bunt.

Yellowstone (MT00159) – a hard red winter wheat with excellent yield potential in both irrigated and dryland conditions of southeast Idaho. Yellowstone was released by Montana State University and the AES in 2005 and has above average test weight and height, and average grain protein. End use quality is average, with above average loaf volume. Under very high production inputs, Yellowstone will lodge under irrigation. It is susceptible dwarf bunt and moderately susceptible to stripe rust.

NOTES:

Table 3. Ten year averages of selected agronomic characteristics, 2006-2015 compared to 2016.

NOTE: "Average" values are for years 2006 to 2015

Winter Wheat (all market classes and locations)

YIELD			TEST WEIGHT			PLANT HEIGHT			HEADING DATE				LODGING		
Year	# of Loc.	bu/A	Year	# of Loc.	lb/bu	Year	# of Loc.	in.	Year	# of Loc.	date	Days fr. Jan.1	Year	# of Loc.	%
2015	6	103	2008	5	60.9	2015	6	35	2011	5	6/19	171	2014	5	25
2009	5	102	2006	4	60.8	2016	6	35	2010	5	6/18	171	2010	5	21
2012	5	102	2007	4	60.3	2009	5	35	2008	5	6/14	166	2009	5	17
2014	4	101	2010	5	60.3	2010	5	34	2009	5	6/9	162	2016	6	11
2006	4	98	2011	5	60.2	2011	5	32	Avg.	---	6/7	160	Avg.	---	11
2007	4	96	2009	5	60.0	2006	4	32	2013	5	6/5	158	2011	5	9
2010	5	95	2012	5	59.7	Avg.	---	32	2014	5	6/4	157	2007	4	9
2016	6	94	Avg.	---	60	2014	5	32	2012	5	6/3	156	2013	5	8
Avg.	---	94	2016	6	59.4	2013	5	31	2006	4	6/1	153	2006	4	8
2011	5	86	2013	5	59.4	2012	5	30	2016	6	5/31	152	2012	5	5
2008	5	80	2015	6	58.1	2007	4	30	2015	6	5/31	152	2015	6	4
2013	5	79	2014	4	56.1	2008	4	30	2007	4	5/30	151	2008	5	4

Spring Wheat (all market classes and locations)

YIELD			TEST WEIGHT			PLANT HEIGHT			HEADING DATE				LODGING		
Year	# of Loc.	bu/A	Year	# of Loc.	lb/bu	Year	# of Loc.	in.	Year	# of Loc.	date	Days fr. Jan.1	Year	# of Loc.	%
2014	5	107	2006	5	62.1	2014	4	34	2008	5	7/9	192	2014	4	16
2009	5	107	2016	5	61.9	2009	5	34	2010	5	7/9	192	2006	5	6
2008	5	102	2009	5	61.8	2010	5	33	2011	5	7/9	192	2007	5	5
2015	5	97	2013	5	61.4	2011	5	32	2009	5	7/3	185	2010	5	5
2011	5	96	2012	5	61.4	Avg.	---	31	Avg.	---	6/28	180	Avg.	---	4
Avg.	---	93	2015	5	61.0	2016	5	31	2006	5	6/27	179	2011	5	3
2010	5	91	2008	5	60.7	2007	5	30	2012	5	6/24	177	2016	5	3
2016	5	91	2010	5	60.6	2008	5	30	2013	5	6/22	175	2015	5	2
2012	5	90	Avg.	---	60	2015	5	30	2007	5	6/21	173	2013	5	2
2013	5	86	2011	5	59.2	2012	5	30	2016	5	6/20	173	2008	5	0.5
2007	5	81	2007	5	58.6	2006	5	29	2015	5	6/18	170	2012	5	0.4
2006	5	72	2014	5	56.5	2013	5	28	2014	5	6/18	170	2009	5	0

Spring Barley (all market classes and locations)

YIELD			TEST WEIGHT			PLANT HEIGHT			HEADING DATE				LODGING		
Year	# of Loc.	bu/A	Year	# of Loc.	lb/bu	Year	# of Loc.	in.	Year	# of Loc.	date	Days fr. Jan.1	Year	# of Loc.	%
2016	5	129	2016	5	53.6	2010	4	37	2008	5	7/11	193	2014	4	56
2012	4	129	2009	4	52.5	2014	4	36	2011	5	7/9	191	2007	5	35
2014	4	127	2010	4	51.7	2009	4	34	2010	4	7/4	187	2013	4	33
2015	4	124	2013	4	51.6	2011	5	33	2009	4	6/30	183	2011	5	26
2013	4	122	2011	5	51.6	2013	4	33	Avg.	---	6/28	180	Avg.	---	25
2009	4	118	2006	5	51.5	2015	4	33	2006	5	6/28	180	2015	4	24
2008	5	114	2012	4	51.4	Avg.	---	32	2012	4	6/24	177	2010	4	24
Avg.	---	113	Avg.	---	51	2008	5	31	2014	4	6/23	176	2006	5	21
2011	5	112	2008	5	50.7	2016	5	31	2007	5	6/23	175	2008	5	15
2010	4	106	2015	4	50.6	2012	4	30	2013	4	6/20	173	2009	4	13
2007	5	99	2007	5	49.2	2007	5	27	2016	5	6/20	172	2016	5	11
2006	5	82	2014	4	48.8	2006	5	26	2015	4	6/15	168	2012	4	0.4

Table 4. Hard Winter Wheat Irrigated Nurseries, 3-Year Averages (2014-2016; 9 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
LCS Jet	152.3	57.8	97	5/24	35	15	12.0
Norwest 553	140.0	59.1	97	5/26	34	2	12.9
IDO1101 (W)	138.6	59.7	98	5/25	35	35	12.9
Keldin	138.3	60.3	98	5/24	37	30	12.2
Yellowstone	134.9	59.1	97	5/26	41	28	12.6
LCS Colonia	133.2	55.4	98	5/29	36	10	12.6
Whetstone	133.1	60.0	97	5/20	39	24	12.9
Greenville	132.8	57.2	98	5/25	32	16	12.6
WB3768 (W)	130.3	59.0	95	5/29	44	27	13.0
Utah 100	125.4	57.2	97	5/29	45	22	12.9
Judee	124.1	59.6	98	5/25	38	32	13.6
Manning	120.9	57.7	97	5/25	41	55	12.9
Garland	118.2	56.0	97	5/29	29	15	13.4
Average	132.5	58.3	97	5/26	37	24	12.8
LSD ($\alpha = .05$)	5.0	0.6	2.0	0.7	0.9	8.9	0.6
CV%	7.6	2.0	4.5	1.0	5.4	80.2	4.6
Pr > F	<.0001	<.0001	0.4456	<.0001	<.0001	<.0001	<.0001

(W) = white

Table 5. Soft White Winter Wheat Irrigated Nurseries, 3-Year Averages (2014-2016; 9 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
SY Ovation	146.4	58.0	98	5/26	38	12	10.2
Bobtail	143.4	55.8	97	5/28	37	17	10.2
LCS Drive	142.5	55.5	97	5/23	32	8	9.5
IDN-02-29001A	140.9	58.5	98	5/26	39	11	10.7
WB-528	139.5	58.2	96	5/24	38	21	10.3
LCS Biancor	139.5	56.6	99	5/26	33	13	9.8
UI Sparrow	139.2	56.1	97	5/31	41	21	10.5
WB1529	138.5	59.3	98	5/25	36	19	10.6
LCS Artdeco	138.1	55.7	97	5/23	35	10	9.4
Bruneau	137.1	57.3	96	5/29	38	21	10.0
IDN-01-10704A	134.1	56.5	96	5/27	40	15	10.1
UI-WSU Huffman	134.0	56.9	97	5/30	39	20	10.6
WB 456	130.2	59.7	97	5/21	36	9	10.6
Stephens	129.2	56.6	98	5/25	37	16	10.5
Madsen	127.0	57.2	96	5/30	39	14	10.7
Brundage	123.0	57.5	97	5/23	37	9	10.5
Average	136.4	57.2	97	5/26	37	15	10.3
LSD ($\alpha = .05$)	6.1	0.6	2.2	0.7	1.0	6.3	0.6
CV%	9.0	2.0	5.0	1.0	5.9	92.4	5.8
Pr > F	<.0001	<.0001	0.5781	<.0001	<.0001	<.0001	<.0001

Table 6. Winter Barley Irrigated Nurseries, 3-Year Averages (2014-2016; 6 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	(>6/64)	Plumps (>5.5/64)	% thin
UTWB10201-15	171.5	46.8	95	5/15	36	25	11.5	63.3	21.6	15.7
Strider	170.8	47.1	93	5/16	37	38	11.1	76.9	14.2	9.6
02Ab431	163.8	50.3	92	5/16	38	28	11.1	91.2	5.7	3.3
Sunstar Pride	162.0	44.5	93	5/28	39	18	10.5	32.6	20.6	47.4
Eight-Twelve	160.9	47.1	92	5/18	39	35	10.9	68.2	17.7	14.7
Alba	160.2	48.8	95	5/18	39	29	11.0	83.8	11.2	5.8
Sprinter	159.8	47.4	93	5/17	39	32	11.2	76.6	14.1	9.8
02Ab669	159.0	50.9	90	5/17	38	29	11.3	88.6	7.6	4.5
TCFW6-140	158.7	48.6	92	5/15	38	26	11.2	71.8	17.7	11.1
02Ab671	157.6	50.3	92	5/18	38	31	11.4	88.9	6.5	5.2
Endeavor	152.6	50.4	89	5/17	39	35	11.3	76.8	13.4	10.2
Streaker*	147.9	51.0	89	5/16	38	41	12.1	38.6	30.0	32.1
Charles	145.1	48.5	90	5/14	34	27	11.4	88.7	7.0	5.0
Schuyler	144.8	48.0	96	5/21	42	46	11.1	57.4	24.2	19.1
Buck*	144.2	57.0	85	5/19	40	38	13.7	43.3	26.2	31.3
Kamiak	136.6	49.2	94	5/13	40	41	11.0	80.4	13.7	6.5
Average	156.0	49.1	92	5/17	38	32	11.4	70.4	15.7	14.5
LSD (a =.05)	10.4	0.7	5.4	0.9	1.4	11.4	0.5	11.8	6.4	10.4
CV%	10.7	2.4	10.4	1.1	6.6	61.7	3.7	13.2	32.1	57.0
Pr > F	<.0001	<.0001	0.0115	<.0001	<.0001	0.0001	<.0001	<.0001	<.0001	<.0001

* indicates hulless variety

Table 7. Hard Winter Wheat Dryland Nurseries 3-Year Averages (2014-2016; 8 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
UI Silver	55.7	61.1	96	6/7	30	0	10.8
SY Clearstone CL2 (W)	55.6	60.1	97	6/6	31	0	11.3
IDO1101 (W)	54.1	61.6	97	6/4	25	0	11.2
Yellowstone	53.7	60.1	95	6/5	29	0	11.2
WB3768 (W)	51.8	60.7	95	6/6	29	0	11.1
Curlew	50.8	60.7	97	6/5	31	2	11.3
Utah 100	50.7	59.2	95	6/7	30	0	11.4
Judee	49.9	61.3	96	6/5	27	0	12.0
Manning	49.8	60.0	96	6/4	28	2	11.5
LCS Colonia	49.2	57.2	96	6/8	26	0	11.2
Juniper	48.3	61.1	97	6/6	33	2	12.2
UI SRG	46.5	59.5	96	6/4	30	5	11.6
Promontory	46.3	60.5	96	6/3	29	0	11.5
Norwest 553	46.3	58.9	93	6/4	24	0	11.4
Greenville	46.1	58.6	96	6/5	23	0	10.6
Lucin-CL	45.6	60.4	97	6/6	30	0	12.0
Golden Spike (W)	45.5	59.3	96	6/6	28	0	9.5
Deloris	44.5	60.4	96	6/7	30	0	11.2
UICF Grace (W)	43.9	59.6	95	6/3	33	2	11.7
Garland	42.4	57.9	96	6/8	22	0	11.6
Whetstone	40.3	59.6	97	5/31	26	0	11.4
Bearpaw	38.3	60.1	95	6/3	27	0	11.7
Average	48.0	59.9	96	6/5	28	1	11.3
LSD (α =.05)	3.1	0.4	1.5	0.7	1.2	2.3	1.1
CV%	12.1	1.2	2.9	0.8	7.8	783.7	9.7
Pr > F	<.0001	<.0001	0.0004	<.0001	<.0001	<.0001	0.0203

(W) = white

Table 8. Soft White Winter Wheat Dryland Nurseries, 3-Year Averages (2014-2016; 4 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
SY Ovation	65.5	57.4	99	6/13	26	0	12.6
Bobtail	64.3	53.5	96	6/14	25	0	10.5
UI Sparrow	64.0	55.4	98	6/16	29	0	10.5
Bruneau	60.4	56.4	97	6/15	28	0	10.8
Madsen	57.1	56.6	97	6/15	27	0	11.5
Otto	57.1	56.3	98	6/17	27	0	11.8
Stephens	54.8	55.3	97	6/11	27	0	11.8
IDN-01-10704A	53.7	54.4	97	6/11	27	0	11.7
IDN-02-29001A	52.0	56.9	98	6/10	26	0	11.0
UI-WSU Huffman	51.9	54.5	96	6/14	26	0	11.0
Eltan	51.3	55.7	99	6/16	27	0	11.5
LWW10-1073	41.9	55.1	99	6/12	26	0	11.9
Brundage	31.4	57.0	98	6/5	24	0	10.6
Average	54.3	55.7	98	6/13	26	0	11.3
LSD ($\alpha = .05$)	5.1	0.6	2.0	0.9	1.1	0.0	1.0
CV%	12.7	1.5	2.8	0.7	5.8	.	6.0
Pr > F	<.0001	<.0001	0.5099	<.0001	<.0001	.	0.0210

Table 9. Hard Spring Wheat Irrigated Nurseries, 3-Year Averages (2014-2016; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Dayn (W)	128.4	60.6	100	6/17	33	1	13.7
SY-Teton (W)	126.3	58.9	99	6/11	30	11	13.5
SY Basalt	118.8	58.6	99	6/21	30	1	13.0
LCS Iron	117.5	59.2	99	6/20	32	2	13.4
LCS Star (W)	116.6	59.2	99	6/18	31	5	13.4
WB9411	115.5	59.9	99	6/16	30	2	14.8
UI Platinum (W)	114.7	60.4	99	6/15	29	5	13.5
Cabernet	112.8	60.2	99	6/18	28	2	14.1
WB9668	112.7	61.1	99	6/16	29	1	15.8
LCS Atomo (W)	109.5	59.1	99	6/15	26	6	13.2
WB-Paloma (W)	109.4	60.1	99	6/16	29	4	14.4
Bullseye	108.0	60.7	99	6/18	30	11	14.0
HRS 3419	107.9	58.7	99	6/22	33	5	12.8
Alzada (D)	106.8	60.5	98	6/16	31	9	14.1
Jefferson	106.5	60.2	99	6/18	33	11	14.2
Kelse	106.0	61.0	99	6/19	35	1	15.1
IDO1202S (W)	105.0	61.0	99	6/20	34	7	13.6
Snow Crest (W)	100.8	59.1	99	6/16	29	3	13.9
Klasic (W)	99.5	59.5	99	6/14	24	3	14.0
Average	111.7	59.9	99	6/17	30	5	13.9
LSD ($\alpha = .05$)	4.2	0.3	0.7	0.4	1.1	5.1	0.5
CV%	9.2	1.2	1.8	0.6	8.5	263.9	4.4
Pr>F	<.0001	<.0001	0.0176	<.0001	<.0001	<.0001	<.0001

(W) = white

(D) = durum

Table 10. Soft White Spring Wheat Irrigated Nurseries, 3-Year Averages (2014-2016; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
UI Stone	126.1	59.8	100	6/17	34	5	10.3
WB6430	121.0	60.0	99	6/18	31	4	10.4
Seahawk	118.5	60.6	98	6/21	35	11	10.6
Alturas	112.9	59.6	99	6/20	34	8	10.4
Tekoa	110.2	60.7	99	6/21	35	7	10.5
UI Pettit	104.6	58.9	99	6/15	32	3	10.4
Babe	103.7	58.8	99	6/20	35	9	10.6
Average	113.8	59.8	99	6/19	34	7	10.4
LSD ($\alpha = .05$)	4.0	0.3	0.9	0.4	0.7	5.9	0.4
CV %	8.7	1.2	2.3	0.6	5.3	217.3	4.7
Pr > F	<.0001	<.0001	0.4091	<.0001	<.0001	0.0706	0.5252

Table 11. 6-Row Spring Barley Irrigated Nurseries, 3-Year Averages (2014-2016; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	(> 6/64)	Plump (>5.5/64)	% Thin
Feed										
Millennium	145.6	48.0	100	6/13	35	10	11.3	86.8	9.5	4.5
Goldeneye	135.6	48.5	99	6/14	35	11	11.2	84.3	11.0	5.4
Herald	130.2	48.1	99	6/17	35	19	11.1	91.2	6.4	3.2
Malt										
01Ab9663	128.7	50.3	99	6/18	38	19	10.8	95.0	3.8	2.0
Lacey	121.6	50.7	99	6/15	36	23	11.4	95.9	3.4	1.2
Tradition	117.8	50.2	99	6/17	36	23	11.4	96.7	2.9	1.1
Celebration	113.7	49.5	99	6/17	35	28	11.6	95.8	3.4	1.6
Quest	111.9	49.9	99	6/16	36	38	11.4	91.6	6.5	2.7
Average	125.7	49.4	99	6/16	36	21	11.3	92.2	5.9	2.7
LSD ($\alpha = .05$)	4.9	0.3	0.6	0.4	1.0	7.5	0.2	3.0	1.9	1.3
CV%	9.6	1.7	1.5	0.6	7.2	87.5	2.3	4.1	39.3	56.8
Pr > F	<.0001	<.0001	0.1683	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Table 12. 2-Row Spring Malt Barley Irrigated Nurseries, 3-Year Averages (2014-2016; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	(> 6/64)	Plump (5.5/64)	% Thin
ABI Voyager	134.2	51.1	97	6/20	34	30	11.2	97.5	2.0	1.3
2Ab07-X031098-31	134.1	51.3	97	6/20	32	27	11.7	93.5	4.5	2.7
ABI Balster	132.5	50.3	99	6/20	30	29	11.5	95.4	3.2	2.3
LCS Genie	131.7	50.7	99	6/23	28	31	11.4	93.6	4.4	2.8
2Ab08-X05M010-82	130.6	50.6	98	6/21	32	39	11.2	91.5	5.5	3.8
ABI Growler	129.5	50.5	99	6/21	31	21	11.3	94.3	4.0	2.6
2Ab04-X01084-27	129.0	49.8	99	6/20	30	41	11.2	93.2	4.6	2.8
Moravian 69	126.8	48.6	99	6/22	28	36	11.3	89.1	7.3	4.4
CDC Copeland	126.3	51.2	99	6/22	35	30	11.3	95.4	3.6	2.1
Conrad	125.7	50.8	99	6/20	31	34	11.1	94.2	3.9	2.8
Merem	124.1	50.0	99	6/24	34	28	11.4	90.9	5.7	4.1
CDC Meredith	120.7	49.8	98	6/23	32	44	11.4	94.1	4.3	2.4
AC Metcalfe	120.3	51.4	99	6/20	34	26	11.4	95.7	3.0	2.1
Hockett	118.0	51.5	99	6/19	31	44	11.6	95.0	3.5	2.4
Harrington	110.8	50.9	99	6/22	32	50	11.5	89.1	7.3	4.5
Average	126.3	50.6	99	6/21	31	34	11.4	93.5	4.4	2.9
LSD ($\alpha = .05$)	5.6	0.5	1.1	0.4	0.9	9.3	0.2	2.6	1.5	1.2
CV%	11.0	2.4	2.7	0.6	7.2	67.2	2.1	3.5	41.6	52.6
Pr > F	<.0001	<.0001	0.0006	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Table 13. 2-Row Spring Feed Barley Irrigated Nurseries, 3-Year Averages (2014-2016; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	(> 6/64)	Plump (5.5/64)	% Thin
Vespa	147.8	51.3	99	6/22	29	33	11.2	94.3	4.2	2.3
Champion	141.4	52.6	99	6/19	32	33	11.7	93.7	4.3	2.7
Xena	139.7	51.5	99	6/20	33	39	11.1	93.1	4.4	3.3
Lenetah	138.4	51.7	100	6/21	33	35	11.4	94.3	4.0	2.7
Harriman	137.7	51.0	99	6/23	32	21	10.9	93.4	4.8	2.6
RWA 1758	132.9	51.0	99	6/20	30	48	11.0	90.8	5.6	4.3
Idagold II	131.4	50.8	99	6/22	30	27	11.3	89.9	6.7	4.2
Baronesse	129.4	51.3	99	6/20	31	48	10.8	91.9	5.0	3.8
Kardia	128.9	49.6	100	6/23	33	37	11.6	87.3	7.8	5.5
Julie*	115.0	56.7	98	6/24	34	25	14.4	88.1	8.2	4.3
Sawtooth*	111.3	57.0	91	6/23	33	26	13.9	80.6	13.6	6.4
Clearwater*	101.6	56.7	98	6/21	33	48	15.2	80.6	12.8	7.4
2Ab09-X06F058HL-31*	97.3	57.4	96	6/21	32	48	14.6	88.8	7.6	4.1
Transit*	96.5	56.8	99	6/22	34	27	14.9	80.6	14.2	5.8
CDC Fibar*	90.7	56.4	97	6/21	34	56	15.4	83.4	11.6	5.6
Average	122.7	53.4	98	6/21	32	37	12.6	88.7	7.7	4.3
LSD ($\alpha = .05$)	5.3	0.5	1.2	0.4	1.0	7.5	0.7	3.9	2.4	1.9
CV%	10.9	2.4	3.1	0.6	7.5	50.9	6.5	5.5	38.1	54.6
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 (2014-2016; 3 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Dayn (W)	53.3	60.2	92	7/1	27	0	12.9
SY-Teton (W)	51.8	59.2	94	7/1	25	0	12.1
IDO1202S (W)	50.1	61.2	91	7/4	27	0	12.6
UI Platinum (W)	43.7	60.3	93	6/29	23	0	12.6
Jefferson	43.1	61.5	91	7/2	25	0	13.3
LCS Star (W)	43.0	60.0	92	7/2	23	0	12.5
WB9411	42.6	60.0	93	6/30	23	0	13.5
Kelse	41.2	60.5	94	7/1	28	0	14.1
WB9668	40.4	60.3	93	6/30	22	0	15.0
LCS Atomo (W)	33.1	59.2	94	6/29	21	0	11.8
Klasic (W)	30.9	60.2	92	6/29	19	0	12.3
Average	43.0	60.2	93	7/1	24	0	13.0
LSD ($\alpha = .05$)	5.7	1.0	3.2	0.8	2.0	0.0	1.2
CV%	16.4	2.0	4.3	0.5	8.2	.	5.3
Pr>F	<.0001	<.0001	0.4975	<.0001	<.0001	.	0.0005

(W) = white

Table 15. Soft White Spring Wheat Dryland Nurseries, 3-Year Averages (2014-2016; 3 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Seahawk	53.1	59.7	92	7/4	23	0	12.8
Alturas	52.1	60.3	94	7/4	25	0	11.5
UI Pettit	49.3	59.6	91	6/30	24	0	11.6
UI Stone	49.2	58.9	94	7/1	24	0	11.7
Tekoa	46.4	59.5	88	7/4	24	0	11.9
Babe	43.1	58.8	94	7/3	25	0	11.9
Average	48.9	59.5	92	7/3	24	0	11.9
LSD ($\alpha = .05$)	9.0	1.1	6.6	0.8	2.4	0.0	1.0
CV%	22.2	2.2	8.7	0.5	9.7	.	4.6
Pr > F	0.2595	0.1059	0.3527	<.0001	0.5278	.	0.1077

Table 16. Dryland Hard Winter Wheat Data Combined from Rockland and Ririe, 2016.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Keldin	64.1	62.4	96	6/4	32	0	10.0
Yellowstone	61.7	61.3	96	6/6	32	0	11.1
SY Clearstone CL2	61.5	61.3	97	6/5	33	0	10.6
UI Silver	61.3	62.0	97	6/7	30	0	10.2
Norwest 553	61.3	61.2	96	6/4	27	0	10.8
IDO1101 (W)	61.1	62.9	98	6/5	28	0	10.7
LCI 13DH22-22 (W)	60.8	62.9	98	6/3	30	0	11.3
OR2110679 (W)	60.7	60.3	97	6/4	29	0	10.5
Utah 100	58.9	60.3	98	6/8	34	0	10.7
OR2111025 (W)	58.8	61.4	96	6/6	29	0	10.5
Colter	58.4	59.9	95	6/7	30	0	11.1
OR2110664 (W)	58.2	60.1	96	6/5	29	0	11.3
WB3768 (W)	57.8	61.6	97	6/9	33	0	10.5
OR2120276H (W)	56.8	61.4	97	6/3	30	0	10.8
Manning	55.2	61.4	97	6/6	32	0	10.8
Warhorse	54.8	61.7	98	6/6	29	0	11.9
LCS Jet	54.6	59.3	99	5/31	25	0	10.3
LCI 13DH04-16 (W)	54.5	61.9	97	6/1	29	1	11.7
Northern	53.9	60.2	96	6/8	28	0	11.9
Judee	53.8	62.1	97	6/4	30	0	12.1
Loma	53.5	61.2	96	6/8	28	0	11.1
LCS Colonia	52.9	58.1	97	6/8	28	0	11.4
Greenville	48.8	60.3	97	6/6	24	0	10.0
UI SRG	48.6	61.5	99	6/3	33	0	11.0
Curlew	47.5	62.5	99	6/2	32	0	10.8
Juniper	46.9	62.3	99	6/3	37	0	12.1
WA8252 (W)	45.9	62.7	98	6/2	28	0	10.4
UICF Grace (W)	45.7	60.5	98	5/28	38	0	10.9
Promontory	45.6	63.2	96	6/1	30	0	11.6
Golden Spike (W)	43.9	61.5	98	6/2	29	0	10.7
LCI13DH14-83 (W)	43.4	62.2	97	6/3	30	0	13.1
Garland	42.1	59.5	95	6/8	22	0	11.2
LCI 13DH14-53 (W)	41.1	60.8	97	6/3	29	0	13.1
OR2120012R	40.2	60.1	95	5/29	26	0	12.6
Judee/Garland	38.7	62.3	98	6/1	27	0	12.0
Eltan (SWW)	37.7	60.1	97	6/7	27	0	9.6
Deloris	37.6	62.7	99	6/4	30	0	10.9
Lucin-CL	36.8	62.5	98	6/4	31	0	12.4
Bearpaw	26.6	62.0	95	6/1	25	0	11.7
Average	51.1	61.3	97	6/4	30	0	11.2
LSD ($\alpha = .05$)	4.8	0.6	2.1	0.8	1.4	0.4	2.2
CV%	10.3	1.1	2.5	0.6	5.0	757.0	10.8
Pr >F	<.0001	<.0001	0.0164	<.0001	<.0001	0.0002	0.2394

(W) = white

(SWW) = Soft White Winter

Table 17. Irrigated Hard Winter Wheat Data Combined from Kimberly, Rupert, and Aberdeen, 2016.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
LCS Jet	144.8	59.3	97	5/22	37	10	12.3
Norwest 553	135.6	60.2	98	5/22	36	4	13.4
OR2120276H (W)	130.1	60.4	99	5/20	38	16	13.1
SY Touchstone (W)	128.9	60.3	98	5/24	36	11	14.1
OR2111025 (W)	127.0	59.0	98	5/24	39	16	13.4
OR2110679 (W)	126.0	57.9	96	5/22	38	22	14.0
OR2120012R	125.2	59.7	96	5/20	39	21	13.2
OR2110664 (W)	124.0	58.1	98	5/24	40	8	13.3
Loma	123.0	59.0	95	5/26	38	32	13.5
Keldin	122.7	60.8	98	5/22	38	26	12.2
Whetstone	121.9	59.9	97	5/19	42	22	13.4
Yellowstone	121.3	59.4	97	5/25	43	22	13.3
WA8252 (W)	121.2	59.1	91	5/24	43	24	13.1
Greenville	117.7	57.5	99	5/23	34	2	12.6
IDO1101 (W)	117.6	60.3	98	5/22	36	29	13.0
LCS Colonia	115.9	56.6	95	5/27	38	23	13.6
Judee	115.3	59.4	98	5/23	40	34	14.4
LCI 13DH22-22 (W)	114.5	61.5	99	5/19	42	33	13.8
Colter	114.5	58.0	97	5/25	42	33	13.0
Northern	113.5	57.8	97	5/28	41	27	13.3
LCI13DH14-83 (W)	113.5	60.4	97	5/21	41	25	13.1
Utah 100	113.5	56.2	95	5/28	47	12	13.2
WB3768 (W)	111.3	59.2	93	5/28	45	23	13.2
SY Clearstone CL2	109.2	59.0	92	5/24	43	28	13.2
UI Silver	108.5	58.5	97	5/25	42	52	13.3
LCI 13DH14-53 (W)	107.8	59.8	97	5/21	38	13	11.9
LCI 13DH04-16 (W)	107.3	60.5	97	5/18	38	57	13.5
Warhorse	106.0	59.6	97	5/24	40	24	14.9
Manning	104.4	58.0	97	5/23	42	49	13.3
Garland	92.6	55.5	97	5/27	30	4	14.0
Average	117.8	59.0	97	5/23	39	23	13.3
LSD ($\alpha = .05$)	7.6	1.1	5.6	1.2	1.6	12.4	1.0
CV%	8.0	2.2	7.2	1.0	5.2	66.3	4.5
Pr >F	<.0001	<.0001	0.5470	<.0001	<.0001	<.0001	<.0001

(W) = white

Table 18. Irrigated Soft White Winter Wheat Data Combined from Kimberly, Rupert, and Aberdeen, 2016.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
LCS Drive	142.8	57.8	99	5/19	35	0	9.1
WB1783	141.9	62.0	98	5/24	40	8	9.6
WA8232	139.0	59.9	98	5/26	39	32	9.7
SY Assure	135.8	60.7	98	5/18	37	19	9.7
SY Ovation	134.5	59.2	99	5/23	38	18	9.4
LWW14-73163	131.8	60.2	98	5/24	38	13	10.4
WA8234	130.9	59.9	98	5/22	39	27	9.3
IDN-02-29001A	130.0	60.7	99	5/23	40	15	10.2
Jasper	129.2	58.3	97	5/25	40	15	9.7
WB-528	128.3	59.9	99	5/21	38	22	9.5
BZ6W09-489	128.3	60.4	98	5/22	37	21	10.0
WB1529	127.8	61.6	98	5/22	38	17	9.8
Norwest Tandem	127.5	59.0	99	5/23	38	7	9.9
LOR-833	126.8	59.7	98	5/20	36	16	10.2
LCS Biancor	125.4	58.5	98	5/23	34	12	9.1
LCS Artdeco	124.9	58.2	98	5/20	37	12	9.0
Norwest Duet	124.9	59.4	98	5/27	43	23	9.8
IDN07-28017B	124.8	60.7	97	5/23	38	17	9.3
Bobtail	123.9	57.3	97	5/25	37	25	9.7
LOR-913	123.6	59.4	99	5/21	37	17	10.6
WB 456	122.8	61.4	98	5/19	38	13	10.1
WB1376CLP	121.1	62.1	98	5/22	40	0	10.2
Bruneau	120.2	58.9	96	5/27	39	27	9.5
OR2110526	119.9	59.1	97	5/19	38	21	9.9
IDN06-18102A	119.3	57.8	97	5/24	38	22	9.9
UI Sparrow	118.4	57.1	98	5/29	42	28	10.4
IDN06-03303B	117.8	57.4	96	5/24	38	19	10.0
UI Castle	116.6	59.5	98	5/27	39	28	10.0
UI-WSU Huffman	115.6	57.7	95	5/27	39	24	9.9
IDN-01-10704A	114.0	58.4	96	5/25	41	20	9.4
UI Palouse	113.7	58.4	97	5/25	38	10	10.5
WA8206	113.7	58.4	98	5/30	40	19	10.5
UI Magic	111.6	59.4	97	5/22	37	14	9.2
Stephens	109.6	58.0	98	5/23	38	21	10.3
Madsen	105.3	58.4	98	5/28	39	24	9.8
Brundage	88.6	57.9	97	5/20	39	6	10.1
Average	123.1	59.2	98	5/23	38	18	9.8
LSD ($\alpha = .05$)	10.2	0.8	1.6	1.1	1.8	10.1	0.9
CV %	10.4	1.7	2.0	0.9	5.9	71.3	5.8
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0382

Table 19. Irrigated Winter Barley Data Combined from Rupert and Aberdeen, 2016.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand	Heading Date	Height (in)	Lodging (%)	Protein (%)	Plump (>6/64)	Plump (>5.5/64)	% Thin
04ARS635-4	156.4	51.4	96	5/15	35	42	10.8	85.5	10.0	5.4
UTWB10201-15	153.6	49.9	95	5/15	38	8	11.2	68.1	21.1	11.7
TCFW6-140	152.6	50.6	97	5/13	37	30	11.0	66.8	17.5	16.5
Alba	151.5	50.9	98	5/16	39	30	10.7	85.4	10.3	5.6
Lightning	149.7	50.7	94	5/12	30	23	11.4	87.7	8.3	4.7
Thunder	149.2	51.4	96	5/13	33	21	11.3	91.4	5.2	4.1
Endeavor	146.0	52.2	98	5/14	37	29	11.1	77.1	13.6	9.8
02Ab669	142.1	52.6	96	5/14	36	26	10.8	86.9	8.9	5.2
Strider	141.2	49.3	94	5/15	39	42	10.9	79.8	12.9	8.4
Charles	139.1	50.9	95	5/13	34	9	11.0	91.2	6.5	3.7
02Ab671	138.7	51.9	96	5/16	35	28	11.0	86.8	7.7	6.2
02Ab431	136.8	53.1	97	5/14	35	23	10.9	93.5	4.6	2.5
Streaker*	136.5	55.1	94	5/14	38	28	11.9	34.4	35.5	31.3
WintMalt	136.2	51.1	86	5/17	34	31	11.1	89.5	7.1	4.5
Sprinter	132.5	49.9	95	5/15	40	33	10.9	76.5	14.4	10.1
05ARS561-208	132.4	49.4	95	5/20	34	29	10.7	74.1	14.5	12.3
Kamiak	131.8	51.7	97	5/12	39	44	10.8	81.8	14.3	4.7
Eight-Twelve	129.3	50.2	94	5/16	41	39	10.6	72.2	19.3	9.8
Maja	128.8	51.2	97	5/14	40	34	10.6	75.2	15.3	10.3
Sunstar Pride	125.5	45.6	95	5/25	39	23	10.3	18.7	22.0	60.1
Buck*	124.9	59.7	87	5/16	40	33	13.0	46.2	30.1	24.9
Schuyler	123.8	50.7	95	5/19	42	42	10.8	51.6	29.7	19.4
05ARS748-270*	116.0	61.0	88	5/18	38	26	15.1	65.5	23.6	11.8
Verdant	91.1	42.8	97	5/24	44	34	11.2	49.3	26.9	25.1
Average	136.1	51.4	95	5/16	37	29	11.2	72.3	15.8	12.8
LSD ($\alpha = .05$)	16.2	1.2	6.9	1.4	2.5	19.1	1.2	22.4	12.3	11.8
CV %	12.0	2.4	7.4	1.0	6.7	66.0	5.3	15.0	37.7	44.5
Pr > F	<.0001	<.0001	0.0429	<.0001	<.0001	0.0149	<.0001	<.0001	0.0006	<.0001

*indicates hulless variety

Table 20. Irrigated Hard Spring Wheat Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2016.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
SY Basalt	126.7	61.8	99	6/18	31	0	11.9
Dayn (W)	125.9	63.3	100	6/16	34	0	13.1
SY-Teton (W)	121.8	60.6	100	6/11	32	2	12.0
WA8240 (CLP)	120.3	62.9	100	6/17	34	0	13.0
SY3015-8	120.0	62.9	100	6/14	32	0	13.4
SY Coho	118.8	61.4	100	6/16	34	8	13.0
LCS Star (W)	117.9	62.5	100	6/17	32	1	12.8
LCS Iron	116.8	62.6	100	6/20	32	0	12.7
Cabernet	115.2	63.3	100	6/18	29	0	13.3
WB9411	113.7	62.8	100	6/15	30	0	13.9
UI Platinum (W)	111.5	63.6	100	6/14	30	0	12.6
IDO1602S	111.4	63.4	100	6/16	32	0	12.8
WB9200	110.6	64.1	100	6/15	31	0	15.2
Bullseye	110.4	63.1	100	6/17	31	1	13.3
WB7589 (W)	110.2	63.1	100	6/15	27	0	13.6
Alum	109.4	62.8	100	6/19	35	11	14.2
Alzada (D)	109.0	63.0	100	6/15	33	0	13.7
WB9668	108.2	63.7	100	6/15	29	0	15.5
LCS Luna	107.2	62.3	100	6/20	30	1	13.2
IDO1202S (W)	106.4	62.3	100	6/19	36	4	12.7
HRS 3419	106.4	61.5	100	6/22	34	0	12.4
WB9518	106.0	62.7	100	6/18	31	0	14.7
IDO1203-A (W)	105.4	62.7	100	6/14	31	0	12.8
WB7328 (W)	104.0	62.8	100	6/13	28	0	14.0
WA8262	101.5	63.1	100	6/16	33	3	13.9
LCS Atomo (W)	101.4	62.3	100	6/14	26	0	12.2
Jefferson	98.1	61.4	100	6/17	34	7	13.4
WB-Paloma (W)	96.3	62.3	100	6/15	30	0	13.5
HRS 3504	95.8	60.7	100	6/20	33	0	13.1
WB9377	95.6	63.1	100	6/19	30	0	13.9
Kelse	93.9	61.9	100	6/19	36	0	14.9
Klasic (W)	91.3	62.2	100	6/13	25	0	12.9
HRS 3616	90.3	62.2	99	6/19	34	1	14.8
Snow Crest (W)	83.2	61.5	100	6/13	27	0	13.7
HRS 3530	82.5	60.7	100	6/21	37	1	13.6
Average	106.9	62.5	100	6/17	32	1	13.4
LSD ($\alpha = .05$)	6.7	0.4	0.6	0.7	1.1	4.0	0.9
CV%	8.6	1.0	0.8	0.5	4.8	540.4	4.6
Pr > F	<.0001	<.0001	0.6757	<.0001	<.0001	<.0001	<.0001

(W) = white

(D) = durum

Table 21. Irrigated Soft White Spring Wheat Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2016.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
SY Saltese	119.8	62.4	100	6/11	36	18	10.2
WB6430	119.4	62.3	100	6/17	31	1	9.5
UI Stone	115.8	61.7	100	6/16	34	3	9.4
Seahawk	115.5	62.6	99	6/21	35	12	9.8
IDO1405S	112.8	61.5	100	6/17	34	1	9.6
Melba*	112.5	62.1	100	6/21	33	8	9.1
IDO1403S	112.0	62.5	100	6/19	34	8	10.2
WB6121	109.6	63.0	99	6/16	32	0	10.6
Alturas	106.3	61.7	100	6/19	35	0	9.2
12-SW-068	105.5	60.9	100	6/18	33	0	9.9
Tekoa	105.2	63.1	100	6/20	35	5	9.8
Diva	105.0	62.0	100	6/20	37	19	10.2
Louise	104.5	61.6	100	6/20	36	21	10.4
UI Pettit	91.5	60.5	100	6/14	31	0	9.6
Babe	88.3	60.4	100	6/19	35	5	10.0
WB 1035 CL	87.1	60.9	100	6/16	32	0	10.8
Average	106.9	61.8	100	6/18	34	6	9.9
LSD ($\alpha = .05$)	6.3	0.4	0.8	0.6	1.3	6.7	0.8
CV%	7.7	0.8	1.0	0.5	4.9	166.9	5.3
Pr > F	<.0001	<.0001	0.7263	<.0001	<.0001	<.0001	<.0001

*=club

Table 22. Irrigated 6-Row Spring Barley Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2016.

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										
Millennium	146.5	50.7	100	6/13	34	3	10.6	88.2	9.2	4.0
UTSB10905-7	143.3	51.4	100	6/15	34	6	10.6	96.6	3.2	1.5
UTSB10902-9	137.9	50.6	100	6/16	32	14	10.6	95.8	3.8	1.7
Goldeneye	136.0	50.8	100	6/13	35	2	10.5	82.6	13.2	5.3
Herald	128.8	50.9	100	6/17	33	8	10.5	92.7	5.7	2.8
Malt										
01Ab9663	123.6	53.2	100	6/18	35	12	10.4	95.7	3.3	2.0
Lacey	120.4	52.7	100	6/16	34	5	11.0	95.2	3.8	1.3
Tradition	110.2	52.2	100	6/16	34	9	10.9	96.1	3.9	1.1
Celebration	107.6	51.4	100	6/18	33	13	11.1	93.8	4.8	2.4
Quest	106.3	52.1	100	6/16	34	26	10.9	91.0	7.1	2.9
Average	126.1	51.6	100	6/16	34	10	10.7	92.8	5.8	2.5
LSD ($\alpha = .05$)	8.0	0.6	0.3	0.9	1.8	7.0	0.4	7.2	4.4	3.1
CV%	9.0	1.6	0.5	0.8	7.6	101.7	2.3	4.5	40.5	64.2
Pr > F	<.0001	<.0001	0.2495	<.0001	0.0380	<.0001	0.0015	0.0005	<.0001	0.0458

Table 23. Irrigated 2-Row Spring Malt Barley Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2016.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)	Plumps (>6/64)	Plumps (>5.5/64)	% Thin
LCS Odyssey	151.7	52.1	100	6/24	27	13	11.0	95.7	3.8	2.0
Moravian 69	142.9	52.3	100	6/20	27	2	10.5	95.2	3.8	2.3
LCS Genie	140.2	53.5	99	6/24	26	3	11.0	95.4	3.6	1.9
Moravian 150	139.3	53.1	100	6/23	26	1	10.8	98.0	2.2	1.2
ABI Voyager	138.8	53.0	100	6/20	31	13	10.5	97.4	2.1	1.6
Idagold II	138.7	53.9	100	6/22	28	0	10.6	96.8	3.0	1.4
2Ab08-X05M010-82	138.6	53.6	97	6/22	31	12	10.5	95.7	3.6	1.9
2B10-4378	136.8	54.3	100	6/20	28	8	10.9	97.3	2.9	1.3
2Ab04-X01084-27	136.3	52.2	98	6/20	28	19	10.5	95.0	3.6	2.3
LCS Westminster	135.3	53.3	100	6/23	28	8	11.1	97.8	2.0	1.1
Moravian 169	135.2	54.7	100	6/22	26	2	11.1	99.2	0.8	1.0
2B10-4162	134.2	54.3	100	6/20	28	8	11.0	92.1	6.2	2.8
2Ab07-X031098-31	132.7	53.8	97	6/20	30	6	10.9	94.1	4.6	2.4
CDC Copeland	130.3	52.7	100	6/22	32	11	10.8	96.4	3.3	1.8
Merem	129.8	52.4	100	6/24	32	8	10.6	92.3	5.2	3.5
ABI Balster	129.3	52.4	100	6/21	28	10	10.8	95.3	3.5	2.6
Conrad	127.2	53.3	100	6/21	29	15	10.5	95.8	3.1	2.3
ACC Synergy	127.1	53.3	100	6/20	30	10	10.6	98.5	1.8	1.1
ABI Growler	125.0	52.5	100	6/21	29	10	10.7	95.4	3.2	2.5
AC Metcalfe	123.7	53.6	100	6/20	32	8	10.6	96.7	2.7	1.8
CDC Meredith	122.7	52.0	99	6/23	31	18	10.6	93.8	4.5	2.8
Harrington	118.8	53.6	100	6/22	31	32	10.7	92.1	6.4	2.8
Hockett	117.3	53.9	100	6/19	28	28	11.0	95.8	3.3	2.2
ND Genesis	113.8	54.0	98	6/19	32	2	10.6	97.3	3.0	1.6
Average	131.9	53.2	99	6/21	29	10	10.8	95.8	3.4	2.0
LSD ($\alpha = .05$)	8.9	0.5	1.4	0.7	1.4	9.4	0.2	3.1	1.7	1.7
CV%	9.1	1.3	1.9	0.5	6.4	122.6	1.5	2.1	32.3	56.0
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.1827

Table 24. Irrigated 2-Row Spring Feed Barley Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2016.

Variety	Yield	Test Wt	Spring	Heading	Height	Lodging	Protein	Plumps		
	(bu/A)	(lb/bu)	Stand %	Date	(in)	(%)	(%)	(>6/64)	(>5.5/64)	% Thin
Altorado	148.6	54.7	100	6/20	30	8	10.5	94.3	4.7	1.9
Oreana	146.7	53.7	100	6/24	26	18	10.6	90.7	7.0	3.2
Vespa	146.1	53.9	99	6/23	27	4	10.6	97.2	2.3	1.5
Xena	143.6	54.0	100	6/20	31	16	10.6	95.7	3.6	1.8
Baronesse	143.0	54.1	100	6/21	29	10	10.2	96.2	3.0	1.8
Harriman	142.9	53.5	100	6/24	30	4	10.4	96.5	3.0	1.9
Claymore	141.0	52.6	100	6/21	32	20	10.4	91.2	6.1	3.9
Lenetah	139.0	54.4	100	6/22	32	12	10.7	95.9	3.3	1.7
Kardia	137.6	52.1	100	6/24	31	10	10.9	91.9	6.3	2.9
Champion	136.4	54.7	100	6/20	30	12	10.7	92.4	5.1	3.6
Idagold II	136.4	53.7	100	6/22	28	4	10.8	94.7	4.3	2.3
RWA 1758	136.2	54.2	100	6/21	29	8	10.4	95.3	3.4	2.4
Julie*	117.3	60.0	100	6/24	32	8	13.5	92.4	5.8	2.6
Clearwater*	112.1	60.6	100	6/21	30	16	12.8	90.0	7.5	3.7
Sawtooth*	110.5	59.7	91	6/23	32	5	11.8	84.1	11.8	5.1
2Ab09-X06F058HL-31*	105.7	61.5	97	6/21	30	21	13.2	92.7	5.8	1.7
Transit*	96.6	59.1	100	6/23	33	11	13.5	85.7	11.3	3.9
CDC Fibar*	90.7	59.9	96	6/21	33	33	13.2	90.2	8.2	2.5
Average	129.5	55.9	99	6/22	30	12	11.4	92.6	5.7	2.7
LSD ($\alpha = .05$)	7.9	0.5	1.6	0.6	1.7	9.9	1.2	3.2	2.1	1.5
CV%	8.7	1.2	2.3	0.5	7.9	116.6	7.6	2.5	25.5	40.9
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0003

* indicates hulless variety

Table 25. Agronomic data for winter wheat at Kimberly, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Winter Wheat									
LCS Jet	171.7	158.1	169.2	62.2	100	5/17	35	0	10.6
LCI13DH14-83 (W)	---	---	168.5	64.7	96	5/17	41	6	10.4
Whetstone	160.9	144.8	168.5	63.2	99	5/14	43	0	11.7
Loma	---	---	166.5	62.9	99	5/22	39	8	11.1
Yellowstone	148.2	147.6	166.5	62.4	99	5/19	44	0	11.0
WA8252	---	---	164.5	63.3	77	5/17	43	13	10.6
Utah 100	155.0	124.4	163.0	61.4	96	5/23	45	13	11.0
Norwest 553	159.9	128.9	162.3	62.5	98	5/19	35	0	11.3
Keldin	158.5	154.8	162.2	63.8	100	5/17	39	1	10.6
OR2110679 (W)	---	---	161.1	61.6	99	5/18	39	0	11.7
OR2111025 (W)	---	---	160.7	63.1	100	5/20	39	0	10.7
Judee	131.0	130.9	160.6	64.3	98	5/19	40	13	11.2
UI Silver	---	---	160.1	61.6	97	5/21	42	65	11.0
Greenville	153.5	136.9	159.3	62.9	100	5/17	35	0	10.5
IDO1101 (W)	173.7	153.9	158.6	62.7	99	5/17	36	0	11.5
OR2120276H (W)	---	---	158.4	63.0	100	5/16	37	0	10.7
Northern	---	131.6	157.8	62.1	99	5/24	43	16	11.7
LCI 13DH14-53 (W)	---	---	157.4	63.8	97	5/17	40	20	9.7
OR2120012R	---	---	156.6	62.1	100	5/16	39	0	11.4
OR2110664 (W)	---	---	156.5	61.7	100	5/20	39	3	10.6
WB3768 (W)	143.1	145.5	154.9	62.7	100	5/24	47	5	11.1
Colter	---	144.8	152.8	61.2	99	5/19	43	34	11.3
04PN028B-3 (W)	---	---	147.5	62.9	100	5/19	36	0	11.5
LCS Colonia	137.5	135.3	147.3	60.5	99	5/23	38	0	11.7
Garland	151.0	128.9	147.2	61.7	99	5/23	31	0	12.0
LCI 13DH22-22 (W)	---	---	146.8	63.4	100	5/14	43	18	11.3
SY Clearstone CL2	---	131.4	145.3	63.0	94	5/19	44	13	10.6
LCI 13DH04-16 (W)	---	---	143.3	63.1	98	5/15	38	76	11.3
Manning	135.8	117.6	142.8	62.9	98	5/18	41	58	11.5
Warhorse	---	---	140.3	63.0	99	5/19	42	18	12.6
Average	148.9	136.5	156.9	62.6	98	5/19	40	13	11.1
LSD ($\alpha=0.05$)	15.4	14.2	14.7	1.4	12.3	2.5	2.6	26.0	
CV %	7.2	7.4	6.7	1.6	8.9	1.3	4.6	147.3	
Pr > F	<.0001	<.0001	0.0005	<.0001	0.5971	<.0001	<.0001	<.0001	

(W) = White

Table 26. Agronomic data for winter wheat at Rupert, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2013	2015	2016						
Hard Winter Wheat									
Keldin	113.6	145.0	103.4	58.4	100	5/20	35	0	13.4
LCS Jet	---	150.7	99.7	53.8	96	5/20	32	0	13.4
LCI 13DH22-22 (W)	---	---	97.2	59.5	100	5/18	36	0	14.7
SY Touchstone (W)	---	---	97.0	57.0	100	5/24	33	0	15.8
Norwest 553	88.6	133.9	94.5	56.4	100	5/21	31	0	14.4
Colter	---	128.5	91.8	55.5	94	5/23	36	0	14.1
Whetstone	112.2	120.0	90.5	57.3	98	5/17	35	0	13.8
Loma	---	---	88.8	56.0	94	5/24	36	0	14.3
LCI 13DH14-53 (W)	---	---	88.8	57.2	98	5/19	32	0	14.0
Yellowstone	92.6	125.5	88.1	56.5	99	5/22	38	0	14.7
IDO1101 (W)	116.5	142.1	87.9	58.1	100	5/21	33	0	13.8
OR2120012R	---	---	87.8	56.3	94	5/19	34	0	13.8
LCS Colonia	---	145.6	87.4	52.2	90	5/25	34	0	15.0
LCI13DH14-83 (W)	---	---	87.4	55.6	100	5/20	36	0	15.0
OR2120276H (W)	---	---	85.9	56.5	100	5/19	33	0	15.3
Greenville	77.0	126.4	83.6	52.4	99	5/21	30	0	13.6
SY Clearstone CL2	---	114.5	80.3	55.1	85	5/23	39	0	14.5
LCI 13DH04-16 (W)	---	---	79.7	57.5	98	5/15	33	0	14.4
OR2110679 (W)	---	---	79.6	52.0	92	5/21	32	0	15.8
UI Silver	---	---	78.9	53.7	99	5/24	39	0	14.5
OR2111025 (W)	---	---	78.8	53.0	100	5/24	34	0	15.5
WA8252 (W)	---	---	78.0	53.4	98	5/23	39	0	14.6
Northern	---	127.3	76.0	53.3	100	5/26	36	0	14.1
WB3768 (W)	---	132.9	75.0	55.1	85	5/27	41	0	15.4
OR2110664 (W)	---	---	74.4	52.8	100	5/22	34	0	15.3
Garland	---	119.1	74.0	51.5	99	5/25	27	0	15.7
Manning	78.8	117.7	73.6	52.1	98	5/22	38	0	14.9
Utah 100	104.9	116.5	70.4	50.0	97	5/26	45	0	15.4
Judee	93.3	111.9	69.6	51.8	99	5/23	36	0	16.2
Warhorse	---	---	63.4	55.1	98	5/24	34	0	15.4
Average	92.0	126.2	83.7	54.8	97	5/22	35	0	14.7
LSD ($\alpha=.05$)	24.3	21.1	11.3	2.5	11.2	1.8	2.8	0.0	
CV %	18.7	11.8	9.6	3.3	8.2	0.9	5.7	.	
Pr > F	0.0005	<.0001	<.0001	<.0001	0.3466	<.0001	<.0001	.	

(W) = White

Table 27. Agronomic data for winter wheat at Aberdeen, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Winter Wheat									
LCS Jet	183.3	120.1	165.4	61.9	95	5/28	44	31	12.9
Norwest 553	169.2	121.5	150.0	61.7	96	5/27	41	13	14.4
OR2120276H (W)	---	---	146.2	61.6	96	5/26	44	48	13.4
SY Touchstone (W)	---	---	142.2	61.1	95	5/28	39	33	15.0
OR2111025 (W)	---	---	141.7	61.0	94	5/30	44	49	14.1
OR2110664 (W)	---	---	141.2	59.9	95	5/30	46	22	13.9
OR2110679 (W)	---	---	137.3	60.1	96	5/27	43	65	14.6
OR2120012R	---	---	131.3	60.9	96	5/26	44	62	14.3
WA8252 (W)	---	---	121.0	60.8	97	6/2	47	59	14.3
Judee	155.7	119.0	115.5	62.1	97	5/29	44	89	15.7
Warhorse	---	---	114.5	60.8	95	5/31	43	55	16.8
Loma	---	---	113.6	58.0	93	6/3	41	89	15.0
LCS Colonia	175.9	123.3	112.9	57.2	97	6/2	42	69	14.1
Greenville	161.1	129.8	110.0	57.2	96	6/1	38	6	13.6
Yellowstone	165.5	128.1	109.4	59.3	94	6/2	46	65	14.1
Utah 100	161.4	105.6	107.1	57.3	94	6/3	50	24	13.3
Northern	---	120.4	106.8	58.2	91	6/3	45	65	14.2
Whetstone	161.7	111.9	106.6	59.2	94	5/25	47	65	14.6
IDO1101 (W)	172.4	114.1	106.2	60.2	95	5/29	39	86	13.7
WB3768 (W)	171.7	118.8	104.1	59.7	95	6/3	48	63	13.0
Keldin	170.9	109.3	102.4	60.4	96	5/28	41	76	12.6
SY Clearstone CL2	---	116.1	102.0	58.8	97	5/30	47	71	14.4
LCI 13DH22-22 (W)	---	---	99.7	61.7	97	5/25	48	80	15.3
LCI 13DH04-16 (W)	---	---	99.0	61.0	97	5/25	42	94	14.9
Colter	---	117.3	98.9	57.4	98	6/2	47	65	13.7
Manning	165.5	117.8	96.8	59.0	94	5/29	47	88	13.4
UI Silver	---	---	86.4	60.2	96	5/31	45	90	14.4
LCI13DH14-83 (W)	---	---	84.6	61.0	96	5/27	45	70	13.8
LCI 13DH14-53 (W)	---	---	77.2	58.5	96	5/26	42	20	11.9
Garland	159.6	109.3	56.6	53.3	94	6/3	33	13	14.3
Average	164.3	115.3	112.9	59.6	95	5/30	44	57	14.1
LSD ($\alpha=.05$)	11.8	18.7	13.5	1.3	3.7	1.8	3.2	27.3	
CV %	5.1	11.5	8.5	1.6	2.7	0.9	5.2	33.8	
Pr > F	<.0001	0.1628	<.0001	<.0001	0.1661	<.0001	<.0001	<.0001	

(W) = White

Table 28. Agronomic data for winter wheat at Ririe, dryland, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Winter Wheat									
Keldin	---	---	50.8	62.2	100	6/4	28	0	9.9
SY Clearstone CL2	23.5	39.1	49.4	61.5	100	6/4	28	0	10.5
Curlew	21.9	46.8	48.5	61.7	100	6/4	29	0	9.2
LCI 13DH22-22 (W)	---	---	48.3	63.2	100	6/3	25	0	11.7
LCS Jet	---	46.7	47.8	57.5	100	6/6	22	0	10.1
UI Silver (W)	25.3	50.5	46.6	61.6	100	6/6	25	0	9.8
WB3768 (W)	21.3	44.3	46.0	61.7	100	6/7	30	0	10.5
Golden Spike (W)	18.3	41.8	45.8	60.6	100	6/5	27	0	9.2
Yellowstone	23.7	45.7	45.5	60.6	99	6/5	27	0	11.1
UI SRG	20.2	45.3	45.3	60.3	100	6/7	30	0	10.5
IDO1101 (W)	21.4	54.7	44.8	63.3	100	6/5	23	0	10.6
Northern	---	44.5	44.6	59.6	100	6/7	24	0	12.4
Juniper	25.8	42.9	43.4	61.4	100	6/6	34	0	11.5
Utah 100	21.3	50.3	43.2	59.9	100	6/7	29	0	9.7
Promontory	21.3	43.7	42.9	62.7	100	6/5	27	0	10.3
WA8252 (W)	---	---	42.7	62.2	100	6/5	25	0	9.1
Colter	---	45.5	42.4	59.6	98	6/6	26	0	11.4
Deloris	23.5	48.5	42.4	61.6	100	6/5	29	0	9.2
Eltan (SWW)	---	---	42.3	59.2	100	6/9	26	0	10.0
OR2110664 (W)	---	---	41.9	58.8	100	6/5	24	0	11.4
Whetstone	19.7	38.8	41.7	60.6	100	6/2	25	0	11.7
LCI13DH14-83 (W)	---	---	41.5	64.1	100	6/3	26	0	11.7
Manning	19.6	47.3	41.2	60.7	100	6/6	26	0	10.2
LCI 13DH14-53 (W)	---	---	40.9	62.9	100	6/4	24	0	11.5
Judee	16.8	43.4	40.9	62.7	100	6/5	25	0	11.0
Lucin-CL	21.9	45.9	40.9	61.4	100	6/7	30	0	12.2
UICF Grace (W)	21.5	41.0	40.8	60.0	100	6/4	35	0	10.3
OR2110679 (W)	---	---	40.6	59.2	99	6/5	23	0	10.3
LCI 13DH04-16 (W)	---	---	39.9	62.5	100	5/31	25	0	11.4
OR2120276H (W)	---	---	39.6	60.4	100	6/4	25	0	11.0
OR2111025 (W)	---	---	39.6	59.9	100	6/6	23	0	10.8
Greenville	19.9	47.8	39.5	60.8	100	6/6	19	0	9.8
Judee/Garland	---	---	39.3	61.4	99	6/6	24	0	10.7
LCS Colonia	25.0	49.9	39.2	56.8	100	6/7	24	0	9.3
Loma	---	---	39.1	60.1	100	6/7	25	0	10.8
Norwest 553	19.2	42.3	39.0	59.9	100	6/5	22	0	11.0
SY Touchstone (W)	---	---	37.5	62.8	100	6/5	21	0	9.6
Garland	19.7	46.7	36.8	60.5	100	6/7	19	0	11.0
Warhorse	---	48.1	36.4	61.5	100	6/6	23	0	12.1
OR2120012R	---	---	35.3	58.8	94	6/4	23	0	11.5
Bearpaw	18.0	42.8	31.8	61.8	94	6/5	23	0	12.1
Average	21.0	44.9	42.1	60.9	100	6/5	25	0	10.7
LSD ($\alpha=0.05$)	4.1	8.6	7.0	0.9	3.9	1.4	1.9	0.0	
CV %	13.8	13.7	11.8	1.0	2.8	0.6	5.5	.	
Pr > F	0.0005	0.0627	<.0001	<.0001	0.4830	<.0001	<.0001	.	

(W) = White

(SWW) = Soft White Winter

Table 29. Agronomic data for winter wheat at Rockland, dryland, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Winter Wheat									
LCS Jet	---	48.8	61.3	61.2	97	5/26	29	0	10.5
Utah 100	40.1	50.7	56.0	62.5	97	5/31	37	0	11.5
Norwest 553	29.1	38.7	54.6	63.0	96	5/25	31	0	10.8
UI Silver	41.6	47.9	53.6	63.8	97	6/1	31	0	10.1
OR2110679 (W)	---	---	53.1	62.5	96	5/25	33	0	11.1
UI SRG	43.7	51.0	52.0	62.8	98	5/31	37	0	11.5
Juniper	37.2	47.9	50.5	63.2	97	5/31	41	0	12.7
UICF Grace (W)	32.1	37.9	50.5	61.0	96	5/22	41	0	11.5
OR2110664 (W)	---	---	50.3	63.0	94	5/27	32	0	12.5
OR2120276H (W)	---	---	49.8	62.9	95	5/24	33	0	11.1
WB1376CLP (SWW)	---	---	49.6	63.4	96	5/26	33	0	13.9
Colter	---	53.8	49.2	61.7	94	5/31	31	0	11.8
WA8252 (W)	---	---	49.1	63.2	97	5/31	32	0	11.7
Promontory	36.4	43.3	48.3	63.7	92	5/28	35	0	12.9
Yellowstone	42.5	51.2	48.3	62.7	94	5/31	33	0	12.6
Keldin	---	---	48.1	63.2	95	5/26	32	0	11.6
IDO1101 (W)	42.8	41.7	47.4	63.6	98	5/26	30	0	11.7
OR2111025 (W)	---	---	47.3	63.7	94	5/28	31	0	9.8
SY Clearstone CL2	42.2	50.1	46.7	62.7	97	5/28	35	0	11.1
WB3768 (W)	40.1	49.7	46.6	62.1	96	6/2	32	0	11.0
Manning	27.2	38.7	46.6	63.4	97	5/29	33	0	12.3
Curlew	42.7	43.3	46.5	63.4	97	5/31	36	0	12.3
LCI 13DH22-22 (W)	---	---	46.1	63.7	97	5/24	31	0	11.9
OR2120012R	---	---	45.1	61.3	97	5/22	31	0	13.7
Northern	---	53.7	44.8	62.3	93	5/31	29	0	11.1
Judee	37.0	44.1	43.0	63.5	97	5/26	33	0	14.0
Greenville	37.4	48.7	42.7	62.3	95	5/29	26	0	10.0
Golden Spike (W)	39.1	57.7	41.9	62.4	96	5/30	32	0	12.2
Warhorse	---	42.1	40.5	63.2	97	5/28	31	0	13.5
Loma	---	---	38.7	63.0	94	6/2	29	0	12.0
Judee/Garland	---	---	38.0	63.3	96	5/27	31	0	13.3
LCI 13DH04-16 (W)	---	---	37.1	62.7	97	5/22	30	0	14.0
LCS Colonia	35.1	51.2	33.4	60.4	96	5/31	30	0	13.7
Eltan (SWW)	---	---	33.1	61.0	95	6/4	28	0	9.3
Deloris	38.1	54.3	32.8	63.7	97	6/2	32	0	12.6
Lucin-CL	36.8	49.8	32.6	63.7	97	5/31	33	0	12.6
Garland	32.4	47.5	31.2	61.7	93	6/1	24	0	11.6
Bearpaw	34.2	43.3	21.4	62.3	96	5/29	28	0	11.4
LCI 13DH14-53 (W)	---	---	12.2	59.1	96	5/25	31	0	17.3
LCI13DH14-83 (W)	---	---	11.9	60.5	96	5/25	32	0	18.1
Average	37.4	46.9	43.3	62.6	96	5/28	32	0	12.2
LSD ($\alpha=0.05$)	8.5	7.7	6.4	0.9	2.7	1.2	3.1	0.0	
CV %	16.3	11.7	10.6	1.0	2.0	0.6	5.9	.	
Pr >F	0.0013	<.0001	<.0001	<.0001	0.0004	<.0001	<.0001	.	

(W) = White

(SWW) = Soft White Winter

Table 30. Agronomic data for winter wheat at Soda Springs, dryland, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Winter Wheat									
Keldin	---	---	103.2	61.5	92	6/16	38	0	8.6
IDO1101 (W)	---	102.7	101.1	61.5	95	6/17	33	0	9.9
Yellowstone	83.5	107.4	101.1	60.2	93	6/17	38	0	9.6
Norwest 553	---	---	99.8	60.5	92	6/16	31	0	10.7
OR2111025 (W)	---	---	99.7	60.3	95	6/17	35	0	11.0
Warhorse	---	90.4	98.3	59.9	95	6/17	36	0	10.0
OR2110679 (W)	---	---	97.5	58.7	95	6/16	34	0	10.1
SY Clearstone CL2	---	108.4	97.2	59.3	93	6/16	38	0	10.2
LCI 13DH04-16 (W)	---	---	97.2	60.2	93	6/14	34	3	9.8
LCI 13DH22-22 (W)	---	---	97.1	61.6	95	6/15	36	0	10.4
LCS Colonia	---	102.9	97.1	56.7	95	6/19	32	0	11.1
Loma	---	---	92.4	60.2	93	6/18	33	0	10.4
Colter	---	114.3	91.8	57.7	95	6/19	35	0	10.0
UI Silver (W)	---	115.0	91.1	60.1	93	6/18	37	2	10.7
OR2110664 (W)	---	---	90.5	57.9	93	6/17	32	0	10.2
OR2120276H (W)	---	---	89.2	60.6	95	6/15	35	0	10.3
WB3768 (W)	---	110.5	88.6	60.7	95	6/20	37	0	9.9
LCI13DH14-83 (W)	---	---	87.8	61.9	95	6/16	35	0	9.4
Manning	58.2	105.9	85.5	59.8	93	6/17	38	2	9.9
Judee	---	113.1	85.3	59.6	93	6/16	34	0	11.3
Utah 100	86.2	97.6	83.8	57.8	96	6/20	39	0	11.0
LCI 13DH14-53 (W)	---	---	79.9	59.2	93	6/14	33	0	10.4
Greenville	---	78.0	79.6	57.0	95	6/17	29	0	10.2
Northern	---	96.2	78.5	58.4	93	6/19	34	2	12.3
Garland	---	74.6	63.6	55.2	90	6/19	24	0	11.1
Average	68.4	97.6	91.1	59.5	94	6/17	34	0.3	10.3
LSD ($\alpha=.05$)	14.9	16.0	12.7	1.2	3.3	1.5	1.6	1.9	
CV %	13.2	10.0	8.4	1.3	2.2	0.6	2.9	351.8	
Pr > F	0.0003	<.0001	<.0001	<.0001	0.1859	<.0001	<.0001	0.1094	

All varieties are Hard Red Winter unless annotated.

(W) = Hard White Winter

Table 31. Agronomic data for winter wheat at Kimberly, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Soft White Winter Wheat									
WA8232	---	---	171.9	62.5	99	5/22	41	0	7.7
Jasper	---	143.9	156.1	61.4	100	5/21	40	0	8.2
IDN-02-29001A	140.4	143.6	152.8	62.3	100	5/19	41	0	9.0
UI Sparrow	154.9	126.9	152.6	59.5	100	5/29	43	0	8.0
BZ6W09-489	---	---	152.2	62.4	99	5/18	37	0	8.1
WB-528	144.9	127.1	151.4	61.4	98	5/18	37	0	8.0
WA8234	---	---	150.3	61.2	98	5/18	38	0	7.8
LOR-913	---	127.2	149.6	60.4	100	5/18	38	0	9.1
SY Assure	---	133.0	149.2	61.7	100	5/14	37	0	8.4
LCS Drive	---	---	149.1	58.1	100	5/14	35	0	8.4
Bruneau	144.9	131.0	148.9	61.2	98	5/24	40	3	7.6
SY Ovation	155.2	150.4	147.3	60.8	100	5/19	40	0	7.9
WB1783	---	---	146.6	62.7	98	5/19	39	0	8.3
WB1529	141.9	137.4	144.8	62.3	100	5/20	39	0	8.8
IDN06-18102A	---	---	143.2	59.9	99	5/20	39	0	8.4
LWW14-73163	---	---	143.0	62.4	99	5/18	37	0	7.7
WB 456	139.7	138.2	142.2	62.7	99	5/14	39	0	8.9
Norwest Duet	---	---	141.1	61.6	98	5/22	43	0	8.0
Norwest Tandem	---	138.3	140.6	61.0	98	5/18	39	0	8.8
UI-WSU Huffman	134.7	141.0	138.2	60.2	98	5/24	40	0	8.0
WB1376CLP	---	123.2	138.2	63.3	99	5/19	40	0	9.6
IDN07-28017B	---	---	138.0	61.5	99	5/19	37	0	7.7
Bobtail	144.8	139.4	137.0	58.9	99	5/21	37	0	8.1
Stephens	141.8	135.7	136.9	60.3	100	5/19	38	0	8.7
LCS Artdeco	132.8	135.2	136.5	60.1	96	5/15	36	0	7.7
WA8206	---	---	136.2	60.8	99	5/28	39	0	8.4
LOR-833	---	134.5	134.9	60.5	98	5/16	35	0	8.6
UI Palouse	---	120.3	133.8	60.8	98	5/23	38	0	8.8
OR2110526	---	---	131.8	60.2	99	5/14	38	0	8.4
Madsen	139.9	121.5	131.0	60.6	99	5/23	39	0	8.1
LCS Biancor	138.7	128.8	128.1	59.6	100	5/19	33	0	8.0
UI Magic	---	131.8	127.7	61.1	98	5/18	36	0	8.2
UI Castle	---	121.4	127.6	61.3	99	5/23	38	0	7.8
IDN-01-10704A	135.2	131.5	126.7	61.3	98	5/20	41	0	8.0
IDN06-03303B	---	---	126.2	59.7	95	5/19	36	0	8.5
Brundage	140.8	138.7	122.7	61.7	98	5/15	38	0	8.3
Average	140.7	133.6	141.2	61.0	99	5/19	38	0	8.3
LSD ($\alpha=0.05$)	15.3	15.9	23.0	0.7	2.9	1.1	3.5	1.2	
CV %	7.7	8.5	11.6	0.8	2.1	0.5	6.5	1200.0	
Pr > F	0.0251	<.0001	0.0339	<.0001	0.2456	<.0001	<.0001	0.4816	

Table 32. Agronomic data for winter wheat at Rupert, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2013	2015	2016						
Soft White Winter Wheat									
LCS Drive	---	136.4	106.4	55.1	100	5/19	32	0	7.8
WB1529	75.5	131.4	104.0	59.7	99	5/20	31	0	8.1
SY Assure	---	126.4	103.1	58.4	100	5/16	33	0	8.9
LCS Biancor	---	150.0	102.4	55.3	100	5/21	30	0	8.5
LCS Artdeco	78.8	150.8	101.7	56.6	100	5/19	34	0	8.0
BZ6W09-489	---	---	100.0	58.0	100	5/20	34	0	9.2
WB-528	74.4	146.4	98.7	57.5	100	5/20	33	0	8.4
OR2110526	---	---	96.7	56.3	100	5/19	34	0	9.6
SY Ovation	81.0	147.4	96.2	56.7	100	5/23	34	0	8.7
WA8234	---	---	96.2	57.5	100	5/21	35	0	7.5
IDN06-03303B	---	---	95.1	54.6	100	5/23	33	0	9.2
WB 1783	---	---	94.2	60.0	100	5/23	35	0	8.5
UI Magic	---	123.4	93.3	58.2	99	5/20	33	0	8.7
LOR-833	---	131.0	92.9	57.3	100	5/19	32	0	9.1
Bobtail	73.0	156.4	91.8	53.9	100	5/24	32	0	8.9
LWW14-73163	---	---	91.8	57.4	100	5/24	34	0	9.8
WB 456	73.0	136.9	91.4	59.9	100	5/18	33	0	8.8
Norwest Tandem	---	130.1	91.1	56.1	100	5/22	33	0	8.4
LOR-913	---	132.1	90.7	58.0	100	5/19	31	0	10.0
WB1376CLP	---	127.4	90.5	60.8	100	5/20	34	0	8.2
Brundage	83.1	140.8	89.2	58.1	99	5/19	31	0	9.7
Bruneau	91.1	133.0	87.0	56.2	98	5/25	35	0	8.5
Norwest Duet	---	---	86.2	56.3	100	5/27	36	0	8.4
UI Castle	---	117.1	86.2	56.3	100	5/27	37	0	9.1
IDN07-28017B	---	---	85.9	58.2	99	5/21	33	0	8.7
IDN-02-29001A	---	127.3	85.9	58.8	100	5/22	34	0	8.7
UI Palouse	---	127.8	84.6	55.8	100	5/23	33	0	9.8
WA8232	---	---	84.4	55.5	100	5/25	35	0	9.5
Jasper	---	130.8	84.3	53.7	98	5/23	36	0	8.3
Stephens	63.5	129.9	80.3	57.0	100	5/20	33	0	8.7
Madsen	87.9	126.7	80.0	55.6	100	5/27	34	0	8.6
UI-WSU Huffman	80.2	126.8	79.9	54.5	98	5/26	35	0	9.3
IDN-01-10704A	---	140.2	79.8	54.9	99	5/23	35	0	9.2
WA8206	---	---	79.6	55.5	100	5/28	35	0	9.1
IDN06-18102A	---	---	78.6	55.9	99	5/22	33	0	9.3
UI Sparrow	74.4	144.9	77.8	54.8	100	5/26	37	0	10.4
Average	73.8	132.7	90.5	56.8	100	5/22	33	0	8.9
LSD ($\alpha=0.05$)	23.2	17.6	9.2	1.8	1.8	2.2	2.8	0.0	
CV %	22.5	9.4	7.3	2.3	1.3	1.1	6.0	.	
Pr > F	0.4641	<.0001	<.0001	<.0001	0.3021	<.0001	<.0001	.	

Table 33. Agronomic data for winter wheat at Aberdeen, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Soft White Winter Wheat									
WB1783	---	---	184.7	63.3	96	5/30	46	23	12.0
LCS Drive	---	---	173.0	60.2	96	5/26	38	1	11.0
WA8232	---	---	160.7	61.8	96	5/31	41	95	12.0
LWW14-73163	---	---	160.7	61.0	96	5/29	43	39	13.6
SY Ovation	176.2	138.6	160.0	60.3	98	5/28	41	55	11.8
SY Assure	---	111.0	155.2	62.2	95	5/25	40	58	11.7
LOR-833	---	122.8	152.7	61.3	97	5/26	43	49	12.9
IDN-02-29001A	181.3	144.6	151.3	60.9	98	5/28	46	45	12.9
Norwest Tandem	---	134.3	150.6	60.1	98	5/28	44	21	12.5
IDN07-28017B	---	---	150.5	62.4	94	5/29	44	50	11.5
Norwest Duet	---	---	147.4	60.4	95	6/2	51	70	13.0
Jasper	---	141.3	147.3	59.7	94	5/31	45	44	12.7
WA8234	---	---	146.2	61.0	97	5/28	45	81	12.6
LCS Biancor	183.3	139.1	145.7	60.5	96	5/28	39	36	10.9
Bobtail	183.0	151.6	143.0	59.9	94	5/30	43	74	12.2
LCS Artdeco	178.8	130.8	136.6	57.9	99	5/26	42	35	11.4
IDN06-18102A	---	---	136.3	57.7	94	5/30	41	66	12.0
UI Castle	---	125.5	136.0	60.9	96	5/30	42	85	13.1
IDN-01-10704A	174.7	149.0	135.5	59.0	93	5/31	47	61	11.1
WB-528	170.1	143.0	134.8	60.7	98	5/26	43	65	12.0
WB1376CLP	---	123.7	134.7	62.2	96	5/27	47	1	12.9
WB 456	140.2	118.5	134.7	61.6	95	5/25	42	39	12.6
WB1529	165.6	148.2	134.5	62.8	96	5/28	43	51	12.5
BZ6W09-489	---	---	132.7	60.9	95	5/28	41	64	12.7
IDN06-03303B	---	---	132.1	58.1	94	5/30	45	56	12.3
OR2110526	---	---	131.3	60.8	94	5/26	42	64	11.7
LOR-913	---	118.8	130.6	59.8	98	5/26	43	50	12.7
UI-WSU Huffman	187.2	135.5	128.7	58.5	90	6/2	43	71	12.4
WA8206	---	---	125.3	59.0	96	6/3	45	58	13.9
UI Sparrow	180.4	151.6	124.8	57.1	95	6/3	46	83	12.8
Bruneau	182.2	144.0	124.6	59.4	92	6/1	43	79	12.5
UI Palouse	---	130.5	122.8	58.7	93	5/29	45	31	12.9
UI Magic	---	139.5	113.8	59.1	94	5/27	42	41	10.9
Stephens	170.5	127.2	111.7	56.7	96	5/29	45	63	13.7
Madsen	172.4	139.3	104.9	58.9	96	6/1	44	71	12.8
Brundage	164.1	134.1	53.9	53.9	96	5/26	48	19	12.4
Average	171.8	137.1	137.5	59.9	95	5/29	43	53	12.3
LSD ($\alpha=.05$)	14.6	18.9	18.5	1.6	3.3	2.2	3.1	30.4	
CV %	6.1	9.9	9.6	1.8	2.5	1.1	5.2	41.2	
Pr > F	<.0001	<.0001	<.0001	<.0001	0.0003	<.0001	<.0001	<.0001	

Table 34. Agronomic data for winter wheat at Ririe, dryland, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Soft White Winter Wheat									
SY Ovation	---	---	55.2	60.4	100	6/5	27	0	11.0
BZ6W09-489	---	---	51.8	60.9	100	6/4	23	0	11.2
LWW14-73163	---	---	51.5	59.6	100	6/5	24	0	9.4
Jasper	---	47.7	51.5	56.3	100	6/6	25	0	10.1
Otto	24.2	55.2	50.1	59.0	100	6/12	26	0	9.4
WB 1783	---	---	50.0	61.8	100	6/5	25	0	10.2
Norwest Duet	---	---	48.8	58.5	100	6/10	27	0	9.2
IDN-01-10704A	23.8	61.5	48.4	57.5	100	6/6	25	0	10.3
UI Sparrow	28.1	54.9	46.1	57.9	100	6/9	27	0	8.7
WA8232	---	---	45.9	59.9	100	6/6	23	0	11.0
Stephens	19.5	52.9	44.8	57.9	100	6/4	23	0	10.7
UI Castle	---	52.3	44.8	58.6	100	6/7	23	0	10.1
Norwest Tandem	---	47.4	44.8	59.3	100	6/5	25	0	9.2
UI-WSU Huffman	23.0	60.8	44.7	57.5	100	6/8	24	0	10.0
IDN-02-29001A	23.9	44.6	43.6	59.9	100	6/5	24	0	9.8
UI Palouse	---	48.9	43.6	58.8	100	6/5	23	0	10.2
LWW10-1073	25.4	56.7	43.6	59.3	100	6/9	26	0	10.8
WA8234	---	---	43.2	59.9	100	6/5	25	0	8.4
WB1376CLP	---	37.2	42.8	62.6	100	6/4	27	0	11.3
Eltan	25.7	54.0	42.2	59.0	100	6/10	25	0	8.6
OR2110526	---	---	41.5	58.1	100	6/4	23	0	10.8
UI Magic	---	49.9	41.5	59.6	100	6/4	24	0	10.3
Bobtail	24.6	61.0	41.2	55.3	100	6/8	22	0	8.9
Bruneau	22.6	50.0	40.7	58.9	100	6/8	24	0	9.2
SY 107	---	---	40.0	58.3	100	6/6	23	0	9.5
Madsen	21.9	45.7	39.4	58.9	100	6/9	25	0	10.7
WA8206	---	---	39.0	58.4	100	6/10	23	0	10.8
LOR-833	---	41.5	37.0	60.1	100	6/3	22	0	9.6
Brundage	21.7	38.3	34.3	61.3	100	6/3	24	0	9.2
Average	23.5	49.2	44.4	59.2	100	6/6	24	0	10.0
LSD ($\alpha=.05$)	3.9	10.5	8.3	0.8	0.0	1.2	2.3	0.0	
CV %	11.8	15.3	13.3	0.9	0.0	0.6	6.7	.	
Pr > F	0.0150	<.0001	0.0003	<.0001	<.0001	<.0001	<.0001	.	

Table 35. Agronomic data for winter wheat at Soda Springs, Dryland, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Soft White Winter Wheat									
IDN-02-29001A	---	---	110.7	57.9	95	6/17	34	0	10.3
LWW14-73163	---	---	108.3	58.3	95	6/18	34	0	11.1
WA8206	---	---	100.6	57.5	90	6/20	33	0	11.1
Jasper	---	132.5	99.2	54.9	93	6/19	35	0	10.5
OR2110526	---	---	97.4	57.2	95	6/16	33	0	10.4
WA8232	---	---	97.4	57.7	92	6/18	34	0	10.5
LOR-833	---	---	96.8	57.3	92	6/15	33	0	10.3
WA8234	---	---	92.7	56.1	94	6/18	36	0	11.6
UI Castle	---	---	92.4	58.1	95	6/19	34	0	10.3
Bobtail	---	124.9	91.9	54.9	92	6/19	31	0	10.6
Bruneau	55.3	119.9	91.7	57.2	92	6/19	36	0	10.4
UI Sparrow	---	120.3	91.5	55.9	90	6/20	37	0	9.3
Norwest Tandem	---	---	91.2	57.0	93	6/17	32	0	10.5
IDN-01-10704A	---	---	90.4	54.9	93	6/18	36	0	12.0
WB1376CLP	---	108.5	89.8	60.2	90	6/17	35	0	11.9
Madsen	64.6	110.3	89.6	57.9	93	6/19	33	0	10.5
UI Magic	---	---	88.4	57.0	90	6/16	31	0	10.8
UI-WSU Huffman	---	---	88.0	55.5	90	6/20	34	0	10.8
UI Palouse	---	---	79.7	55.5	94	6/19	33	0	12.6
Stephens	53.4	101.2	79.4	55.3	90	6/17	32	0	11.6
Average	68.4	113.7	93.4	56.8	92	6/18	34	0	10.8
LSD ($\alpha=.05$)	14.9	14.2	15.3	1.7	3.1	1.2	1.9	0.0	
CV %	13.2	7.5	9.8	1.8	2.0	0.4	3.5	.	
Pr > F	0.0003	<.0001	0.0345	<.0001	0.0	<.0001	<.0001	.	

Table 36. Agronomic data for winter barley at Rupert, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)	Plump		
	2013	2015	2016							(>6/64)	(>5.5/64)	% Thin
TCFW6-140	---	141.7	154.6	51.7	100	5/10	32	0	10.7	74.3	16.2	9.6
02Ab671	92.1	148.7	145.1	52.4	100	5/12	31	0	10.3	93.4	4.9	2.5
Eight-Twelve	92.6	146.3	145.0	49.6	99	5/12	36	0	10.2	70.1	19.9	10.8
UTWB10201-15	---	155.6	142.7	50.8	99	5/11	33	0	11.4	78.5	14.6	7.2
Strider	74.0	164.0	142.1	49.7	99	5/11	35	0	10.4	83.3	13.1	4.6
02Ab431	78.5	151.3	140.8	53.4	100	5/10	31	0	10.6	91.9	5.2	3.1
Alba (feed)	87.6	134.4	140.8	50.3	100	5/13	35	0	9.9	84.4	11.1	5.7
02Ab669	91.2	160.5	138.0	52.7	100	5/10	32	0	10.3	92.6	5.2	3.2
04ARS635-4	---	132.4	136.3	51.5	100	5/11	30	0	10.4	82.2	12.3	6.5
Sprinter	46.3	138.6	136.1	50.6	97	5/11	35	0	10.6	85.2	12.3	3.4
Endeavor	85.8	138.2	136.0	52.7	100	5/10	32	0	10.7	76.5	15.0	8.8
Schuyler	60.5	122.3	136.0	51.0	98	5/16	41	0	10.2	53.3	31.3	16.2
Lightning	---	---	133.9	50.8	99	5/9	25	0	10.7	86.8	9.5	4.2
Thunder	---	---	133.5	51.5	99	5/9	28	0	10.6	92.1	5.4	2.9
WintMalt	---	---	132.2	51.1	77	5/13	30	0	10.4	89.5	7.8	3.5
Maja	---	183.0	130.8	52.2	100	5/10	35	0	10.4	88.0	9.2	3.5
Streaker*	67.6	130.0	128.2	56.0	98	5/12	34	0	10.7	36.4	37.0	27.5
Charles	85.8	141.6	127.0	50.9	99	5/9	27	0	10.7	90.2	7.6	3.6
Buck*	---	131.0	126.3	59.3	95	5/14	35	1	11.4	34.3	37.9	28.8
05ARS561-208	---	150.9	124.3	48.7	99	5/17	27	1	10.2	75.6	14.5	10.9
Sunstar Pride	62.2	157.5	123.3	43.4	99	5/22	36	0	10.0	11.0	21.6	67.7
Kamiak	57.6	114.7	120.9	51.5	99	5/9	35	0	10.3	80.6	14.9	4.9
05ARS748-270*	---	125.5	97.7	60.5	93	5/16	32	0	13.5	47.1	36.0	17.9
Verdant	---	120.0	90.3	39.8	100	5/22	41	0	10.6	32.2	36.0	32.4
Average	77.4	141.8	131.8	51.3	98	5/12	33	0	10.6	72.1	16.6	12.1
LSD ($\alpha=.05$)	42.4	31.0	12.9	1.0	13.1	2.1	2.3	0.8				
CV %	38.3	15.5	6.9	1.4	9.5	1.1	5.0	700.3				
Pr > F	0.2745	0.0069	<.0001	<.0001	0.4599	<.0001	<.0001	0.4773				

*indicates hulless variety

Table 37. Agronomic data for winter barley at Aberdeen, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
04ARS635-4	---	161.0	176.5	51.2	93	5/19	40	84	11.2	88.8	7.6	4.2
Lightning	---	---	165.5	50.6	90	5/15	36	45	12.1	88.6	7.1	5.1
Thunder	---	---	164.8	51.3	93	5/17	38	41	12.1	90.7	4.9	5.3
UTWB10201-15	234.7	159.9	164.5	49.1	91	5/18	42	15	10.9	57.6	27.5	16.1
Alba	215.0	148.4	162.2	51.6	95	5/20	43	60	11.5	86.4	9.4	5.4
Endeavor	173.2	159.4	156.0	51.7	95	5/18	43	59	11.5	77.6	12.2	10.8
Charles	168.8	137.2	151.2	50.9	91	5/16	40	18	11.3	92.1	5.3	3.7
TCFW6-140	187.9	158.7	150.7	49.6	95	5/17	43	61	11.2	59.2	18.8	23.3
02Ab669	184.6	165.7	146.1	52.5	92	5/19	39	51	11.3	81.2	12.6	7.2
Streaker*	184.8	151.7	144.9	54.2	90	5/16	42	55	13.2	32.4	34.0	35.0
Kamiak	158.4	146.1	142.7	51.9	95	5/15	43	89	11.3	82.9	13.7	4.5
05ARS561-208	---	162.7	140.6	50.0	91	5/23	40	57	11.2	72.5	14.5	13.6
Strider	221.6	185.9	140.4	49.0	89	5/18	43	84	11.4	76.3	12.7	12.2
WintMalt	---	---	140.2	51.1	95	5/20	39	61	11.7	89.5	6.4	5.5
05ARS748-270*	---	146.4	134.3	61.4	83	5/21	44	51	16.7	83.8	11.1	5.6
02Ab671	197.8	164.0	132.3	51.4	93	5/19	40	56	11.6	80.1	10.5	9.8
02Ab431	232.3	154.8	131.3	52.9	95	5/18	40	45	11.2	95.0	4.0	1.8
Sprinter	208.8	186.4	128.9	49.2	93	5/19	44	65	11.3	67.7	16.4	16.7
Sunstar Pride	236.1	165.6	127.6	47.8	90	5/28	43	46	10.5	26.3	22.4	52.4
Maja	---	145.4	126.9	50.3	94	5/18	45	68	10.8	62.3	21.4	17.0
Buck*	173.7	166.7	123.6	60.2	79	5/19	45	64	14.6	58.0	22.2	20.9
Eight-Twelve	220.9	178.5	113.6	50.7	89	5/19	46	79	11.0	74.2	18.7	8.7
Schuyler	174.7	179.5	111.6	50.4	91	5/22	44	84	11.3	49.9	28.1	22.6
Verdant (OR712)	---	126.7	91.9	45.8	94	5/26	47	69	11.9	66.3	17.7	17.8
Average	195.8	159.6	140.3	51.4	91	5/19	42	59	11.8	72.5	15.0	13.6
LSD ($\alpha=0.05$)	24.4	15.2	30.3	2.3	4.8	1.8	4.4	38.6				
CV %	8.8	6.7	15.2	3.1	3.7	0.9	7.4	46.7				
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0002	0.0249				

*indicates hulless variety

Table 38. Agronomic data for spring wheat at Rupert, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Spring Wheat									
Dayn (W)	146.7	122.3	154.4	63.7	100	6/7	36	0	12.3
WA8240	---	---	147.6	63.4	100	6/9	36	0	12.2
SY-Teton (W)	142.3	123.1	140.4	61.7	100	6/7	33	0	11.9
LCS Star (W)	131.4	126.0	139.9	63.2	100	6/9	33	0	12.2
SY Basalt	132.6	114.1	138.6	61.8	100	6/14	29	0	11.2
SY Coho	142.8	106.7	138.3	61.9	100	6/13	33	0	12.6
IDO1602S	---	---	136.9	63.4	100	6/8	33	0	11.7
UI Platinum (W)	148.6	96.7	134.7	64.1	100	6/6	30	0	12.0
Bullseye	126.7	94.5	133.2	64.4	100	6/9	34	0	12.3
Alzada (D)	141.5	91.9	132.9	63.5	100	6/7	34	0	12.7
IDO1202S (W)	120.8	98.1	132.9	62.9	100	6/12	38	0	11.8
Alum	---	---	132.5	63.6	100	6/10	36	0	13.3
WB9411	143.7	116.9	132.3	63.3	100	6/6	30	0	12.5
Cabernet	140.7	100.8	130.9	63.0	100	6/10	30	0	12.5
10SB0087-B	---	97.9	130.5	62.5	100	6/12	29	0	11.9
LCS Iron	140.2	112.6	129.2	62.6	100	6/12	33	0	12.0
HRS 3419	121.9	97.5	129.1	62.5	100	6/14	35	0	11.7
WB9200	---	---	127.8	64.9	100	6/7	32	0	14.6
WB7589 (W)	---	107.7	125.3	63.7	100	6/7	27	0	13.1
WB9518	---	---	122.0	62.8	100	6/9	31	0	14.0
Jefferson	114.7	105.6	121.9	62.6	100	6/8	35	0	12.1
HRS 3504	---	102.8	121.8	61.8	100	6/13	35	0	12.4
WA8262	---	---	121.2	63.7	100	6/8	34	0	12.7
WB9668	136.5	97.8	120.1	64.0	100	6/6	30	0	14.7
WB7328 (W)	---	99.5	119.9	63.2	100	6/6	28	0	14.1
LCS Atomo (W)	130.9	113.4	119.4	62.7	100	6/6	26	0	12.0
IDO1203-A (W)	---	111.5	119.2	63.4	100	6/6	30	0	12.3
WB9377	---	---	117.2	63.9	100	6/11	31	0	12.9
SY3015-8	---	---	116.2	63.0	100	6/9	32	0	12.6
HRS 3616	---	---	113.4	63.6	100	6/10	35	0	13.6
WB-Paloma (W)	146.0	101.0	113.0	63.0	100	6/7	31	0	12.7
Klasic (W)	124.0	100.1	106.5	63.0	100	6/6	25	0	12.1
Kelse	144.7	101.7	105.2	62.3	100	6/11	37	0	14.5
HRS 3530	---	113.6	99.1	61.5	100	6/13	40	0	11.6
Snow Crest (W)	137.5	91.2	94.6	62.5	100	6/5	28	0	13.4
Average	132.4	104.9	124.9	63.1	100	6/9	32	0	12.6
LSD ($\alpha=.05$)	15.1	16.3	11.5	0.7	0.0	1.1	2.2	0.0	
CV %	8.1	11.0	6.5	0.8	0.0	0.5	5.0	.	
Pr > F	<0.0001	0.0001	<.0001	<.0001	.	<.0001	<.0001	.	

All varieties are Hard Red unless annotated.

(W) = Hard White

(D) = Durum

Table 39. Agronomic data for spring wheat at Aberdeen, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Spring Wheat									
Dayn (W)	168.0	140.6	160.2	62.2	100	6/12	38	0	13.6
LCS Iron	---	---	153.6	62.3	99	6/16	36	0	13.4
LCS Star (W)	148.4	118.4	152.3	62.0	100	6/14	36	5	12.9
SY Basalt	152.7	133.7	148.2	60.9	97	6/18	35	0	13.4
SY3015-8	---	---	147.4	62.0	100	6/13	35	0	13.9
WB9518	---	---	146.3	62.8	100	6/14	35	0	15.5
WB9668	148.6	107.9	146.0	63.3	98	6/12	34	0	16.0
WB9200	---	---	145.0	64.1	100	6/12	35	0	15.7
WA8240 (CLP)	---	---	143.8	61.8	100	6/13	38	0	13.6
Cabernet	148.9	110.1	142.3	62.9	100	6/14	32	0	12.8
WB9411	147.4	111.0	140.4	61.7	100	6/12	34	0	14.4
SY Coho	153.6	125.5	140.2	60.2	100	6/17	38	25	14.5
Alzada (D)	145.4	100.0	136.7	62.1	99	6/12	37	0	14.5
WB7589 (W)	---	109.3	136.4	62.3	100	6/12	28	0	14.7
SY-Teton (W)	153.4	126.7	135.2	58.4	100	6/13	36	5	13.0
UI Platinum (W)	152.3	117.8	134.2	62.7	100	6/11	35	0	12.5
IDO1602S	---	---	132.5	62.7	99	6/13	37	0	12.4
LCS Luna	---	122.2	130.2	61.4	100	6/15	35	3	13.2
HRS 3419	131.5	117.3	129.8	60.5	100	6/18	38	0	12.5
Alum	---	---	121.6	61.7	100	6/15	38	43	14.5
WB7328 (W)	---	106.8	117.0	61.9	100	6/11	30	0	13.8
WA8262	---	---	116.9	61.3	100	6/13	36	10	14.0
LCS Atomo (W)	155.1	110.7	115.2	59.2	100	6/12	30	0	12.2
Bullseye	148.0	118.2	109.5	58.9	99	6/14	34	3	13.7
IDO1202S (W)	158.2	149.4	105.5	60.1	99	6/15	38	15	13.3
HRS 3616	---	---	105.0	60.2	98	6/16	38	5	14.4
Kelse	153.4	107.0	102.8	59.8	100	6/15	39	0	14.9
IDO1203-A (W)	---	115.4	100.4	59.8	98	6/12	35	0	13.0
WB-Paloma (W)	151.3	118.9	92.2	58.9	100	6/12	33	0	14.4
WB9377	---	---	90.8	60.7	100	6/15	34	0	13.6
Jefferson	148.8	124.7	85.8	57.4	99	6/14	38	27	13.9
HRS 3504	---	137.7	82.9	56.7	100	6/16	35	0	13.3
Klasic (W)	134.5	103.7	79.6	58.1	100	6/11	28	0	12.9
Snow Crest (W)	145.7	106.1	75.6	58.1	100	6/11	30	0	13.4
HRS 3530	---	121.9	65.4	56.8	100	6/17	39	4	14.5
Average	146.7	117.8	120.8	60.7	99	6/14	35	4	13.8
LSD ($\alpha=0.05$)	12.0	13.0	8.3	1.1	2.4	1.0	2.0	15.3	
CV %	5.8	7.9	4.9	1.2	1.7	0.4	4.2	273.0	
Pr > F	<.0001	<.0001	<.0001	<.0001	0.7279	<.0001	<.0001	<.0001	

All varieties are Hard Red unless annotated.

(W) = Hard White

(D) = Durum

Table 40. Agronomic data for spring wheat, Idaho Falls, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Spring Wheat									
IDO1203-A (W)	---	115.5	105.1	63.6	100	6/13	30	0	11.8
WB7328 (W)	---	105.6	100.7	63.3	100	6/10	28	0	12.6
WB9411	115.9	99.8	98.0	63.0	100	6/13	29	0	13.7
SY3015-8	---	---	96.5	63.8	100	6/18	30	0	13.6
Cabernet	107.8	98.5	96.0	63.7	100	6/17	29	0	12.9
WA8240 (CLP)	---	---	95.5	63.2	100	6/18	33	0	12.6
Dayn (W)	124.8	116.1	94.7	63.9	100	6/17	33	0	12.5
Klasic (W)	100.1	102.1	94.7	63.6	100	6/12	24	0	11.2
SY Basalt	98.9	79.1	93.4	62.7	100	6/21	31	0	11.1
Jefferson	101.9	93.7	93.4	63.1	100	6/16	32	0	12.9
WB9200	---	---	91.9	64.2	100	6/13	30	0	13.6
Alum	---	---	91.4	64.0	100	6/19	34	0	14.2
WB-Paloma (W)	113.3	98.4	91.4	63.3	100	6/14	28	0	12.4
Bullseye	80.6	95.4	91.1	65.2	100	6/16	29	0	12.9
IDO1602S	---	---	90.8	64.1	100	6/15	30	0	11.7
SY-Teton (W)	---	107.8	89.8	61.8	100	6/14	29	0	11.2
LCS Star (W)	107.4	80.0	88.7	62.9	100	6/17	31	0	11.8
WB7589 (W)	---	101.2	88.1	63.4	100	6/15	28	0	11.1
LCS Iron	---	---	86.8	63.4	100	6/20	31	0	11.6
Alzada (D)	113.3	88.2	85.2	63.4	100	6/14	30	0	11.9
WB9668	111.2	102.4	84.8	63.7	100	6/15	28	0	14.2
WB9377	---	---	84.1	63.9	100	6/18	29	0	14.2
UI Platinum (W)	105.3	106.4	84.1	63.5	100	6/11	28	0	11.3
Snow Crest (W)	114.0	107.4	83.2	62.8	100	6/11	27	0	12.3
HRS 3530	---	75.9	82.5	62.4	100	6/20	36	0	13.2
WA8262	---	---	82.1	63.6	100	6/14	31	0	13.7
HRS 3504	---	91.1	81.9	62.7	100	6/20	31	0	13.0
IDO1202S (W)	73.4	31.3	80.2	63.8	100	6/19	35	0	12.0
HRS 3419	90.6	85.0	80.0	61.7	100	6/22	33	0	10.3
LCS Atomo (W)	96.9	98.8	80.0	63.5	100	6/14	25	0	11.4
LCS Luna	---	67.4	79.6	62.9	100	6/20	29	0	12.8
SY Coho	107.1	67.8	77.9	62.2	100	6/20	31	0	12.0
Kelse	110.2	73.3	77.9	63.3	100	6/19	35	0	14.5
WB9518	---	---	75.9	63.0	100	6/17	30	0	13.3
HRS 3616	---	---	75.8	62.8	100	6/19	33	0	15.1
Average	103.0	91.2	87.7	63.3	100	6/16	30	0	12.6
LSD ($\alpha=.05$)	13.7	14.8	18.3	0.5	0.0	1.4	2.2	0.0	
CV %	9.4	11.6	14.9	0.6	0.0	0.6	5.3	.	
Pr > F	<.0001	<.0001	0.1707	<.0001	.	<.0001	<.0001	.	

All varieties are Hard Red unless annotated.

(W) = Hard White

(D) = Durum

Table 41. Agronomic data for spring wheat at Ashton, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Spring Wheat									
Bullseye	93.3	97.9	107.7	63.8	100	6/29	28	0	14.5
IDO1202S (W)	95.8	105.3	107.0	62.3	100	6/30	33	0	13.7
LCS Iron	112.2	110.2	97.5	62.2	100	7/2	30	0	13.8
IDO1203-A (W)	---	98.6	96.9	64.0	100	6/26	27	0	14.1
HRS 3504	---	113.0	96.6	61.8	100	7/2	31	0	13.7
Dayn (W)	125.6	92.8	94.5	63.4	100	6/27	30	0	14.2
WA8240 (CLP)	---	---	94.5	63.2	100	6/29	30	0	13.7
UI Platinum (W)	116.9	86.5	92.7	64.2	100	6/26	27	0	14.8
Alum	---	111.6	92.2	62.1	100	7/2	31	0	14.7
Cabernet	103.8	81.7	91.7	63.5	100	7/1	25	0	15.2
Jefferson	96.9	99.6	91.2	62.5	100	6/29	31	0	14.7
LCS Atomo (W)	108.9	93.5	91.1	63.8	100	6/26	23	0	13.1
WB7589 (W)	---	100.6	91.0	63.0	100	6/27	25	0	15.3
LCS Star (W)	111.8	103.9	90.8	61.9	100	6/29	28	0	14.3
WB9377	---	---	90.1	63.9	100	7/1	28	0	15.0
Kelse	109.3	96.9	89.8	62.4	100	6/30	33	0	15.8
WB-Paloma (W)	103.1	95.3	88.7	63.9	100	6/27	26	0	14.3
LCS Luna	---	92.6	88.6	62.2	100	7/2	28	0	14.9
HRS 3419	124.1	101.4	86.5	61.3	100	7/4	33	0	15.2
WA8262	---	---	85.9	63.9	100	6/29	31	0	15.1
IDO1602S	---	---	85.2	63.4	100	6/27	29	0	15.3
Klasic (W)	88.2	76.7	84.2	63.9	100	6/26	24	0	15.3
WB9411	113.6	82.5	83.9	63.0	100	6/27	28	0	15.0
HRS 3530	---	84.3	83.0	62.0	100	7/3	34	0	15.0
WB9668	118.0	97.6	82.0	63.9	100	6/27	26	0	17.0
Alzada (D)	95.5	70.5	81.1	62.8	100	6/28	30	0	15.7
WB9518	---	---	79.6	62.3	100	7/1	28	0	16.0
Snow Crest (W)	76.2	79.9	79.2	62.5	100	6/26	25	0	15.9
WB7328 (W)	---	87.3	78.6	62.8	100	6/27	25	0	15.7
WB9200	---	---	77.6	63.2	100	6/28	27	0	17.0
HRS 3616	---	---	67.0	62.3	100	7/1	31	0	16.0
Average	100.1	93.5	88.0	63.0	100	6/29	28	0	15.0
LSD ($\alpha=.05$)	13.4	18.2	10.6	1.0	0.0	1.5	1.8	0	
CV %	9.4	13.9	8.6	1.1	0.0	0.6	4.5	.	
Pr > F	<.0001	<.0001	<.0001	<.0001	.	<.0001	<.0001	.	

All varieties are Hard Red unless annotated.

(W) = Hard White

(D) = Durum

Table 42. Agronomic data for spring wheat at Soda Springs, dryland, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
	2014	2015	2016						
Hard Spring Wheat									
Alum	---	---	31.6	64.0	100	7/4	25	0	10.7
IDO1202S (W)	50.6	68.6	31.1	63.5	98	7/4	25	0	10.7
Dayn (W)	46.9	83.7	29.1	62.0	95	7/2	23	0	11.0
SY-Teton (W)	49.2	79.1	27.2	61.5	100	7/2	25	0	10.0
Jefferson	54.2	48.8	26.4	62.5	100	7/3	24	0	10.9
IDO1203-A (W)	---	40.0	25.8	63.5	100	7/1	23	0	9.4
UI Platinum (W)	45.2	61.1	24.8	62.5	100	6/30	22	0	9.4
LCS Star (W)	43.5	62.2	23.4	62.0	100	7/3	21	0	9.4
Kelse	47.1	53.2	23.4	61.5	99	7/5	26	0	11.9
SY Selway	---	62.1	23.3	61.5	100	7/2	25	0	10.7
Klasic (W)	34.9	35.9	22.1	62.0	98	6/30	17	0	9.9
IDO1602S	---	---	21.3	62.5	100	7/1	25	0	11.5
WB7328 (W)	---	---	21.0	62.0	98	6/29	22	0	10.9
LCS Iron	---	64.4	19.5	60.5	99	7/5	24	0	11.2
WB7589 (W)	---	---	19.1	62.5	98	7/1	19	0	10.1
LCS Atomo (W)	---	---	19.0	61.5	99	6/29	19	0	9.5
LCS Luna	---	60.0	18.8	61.5	100	7/4	21	0	11.4
WB9377	---	---	18.3	63.0	98	7/4	23	0	13.0
WB9411	44.2	66.2	17.5	61.0	95	7/2	21	0	9.9
WB9668	41.5	63.1	16.7	62.5	99	7/1	20	0	12.4
WB9200	---	---	16.6	62.5	96	7/1	22	0	12.4
WB9518	---	---	15.0	61.5	99	7/3	22	0	12.1
Average	44.5	57.7	22.3	62.2	98	7/2	22	0	10.8
LSD ($\alpha=.05$)	8.4	15.2	5.6	1.4	4.1	1.0	2.3	0	
CV %	13.3	18.6	17.7	1.6	3.0	0.4	7.4	.	
Pr > F	0.0022	<.0001	<.0001	0.0005	0.3700	<.0001	<.0001	.	

All varieties are Hard Red unless annotated.

(W) = Hard White

Table 43. Agronomic data for spring wheat at Rupert, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand%	Heading Date	Heading Height (in)	Lodging (%)	Protein (%)
	2014	2015	2016						
Soft White Spring Wheat									
UI Stone	150.2	121.2	133.3	61.3	100	6/9	37	0	8.3
WB6430	139.1	111.4	133.3	62.1	100	6/10	32	0	8.4
IDO1405S	---	---	131.9	61.5	100	6/9	38	0	8.7
Seahawk	117.6	116.7	131.6	62.8	100	6/15	37	0	8.6
Melba*	---	---	128.2	62.0	100	6/15	33	0	8.2
Louise	---	---	127.7	62.2	100	6/12	38	0	9.1
SY Saltese	---	---	127.0	63.1	100	6/8	36	0	8.5
IDO1403S	---	---	126.8	62.6	100	6/11	35	0	9.3
Alturas	118.3	112.9	125.0	62.2	100	6/12	36	0	8.2
Diva	---	89.2	122.2	62.1	100	6/12	38	0	8.8
Tekoa	115.0	110.8	122.2	63.9	100	6/13	36	0	8.7
12-SW-068	---	---	122.2	61.4	100	6/11	35	0	8.5
WB6121	---	---	119.2	63.1	100	6/8	34	0	9.4
Babe	119.2	103.9	113.7	62.7	100	6/11	36	0	8.4
UI Pettit	142.4	94.1	110.4	61.4	100	6/6	31	0	8.8
WB 1035 CL	---	---	100.8	62.0	100	6/7	32	0	9.9
Average	129.9	105.4	123.5	62.2	100	6/11	35	0	8.7
LSD ($\alpha=.05$)	20.2	8.5	12.8	0.5	0.0	1.1	2.4	0.0	
CV %	10.8	5.6	7.3	0.5	0.0	0.5	4.9	.	
Pr > F	0.0008	<.0001	0.0002	<.0001	.	<.0001	<.0001	.	

* = club wheat

Table 44. Agronomic data for spring wheat at Aberdeen, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
	2014	2015	2016	(lb/bu)	Stand %	Date	(in.)	(%)	(%)
Soft White Spring Wheat									
WB6121	---	---	150.9	62.8	98	6/12	36	0	11.7
Seahawk	166.7	140.4	145.1	61.3	97	6/17	39	48	12.2
Melba*	---	---	144.0	60.9	100	6/18	38	33	10.5
IDO1403S	---	---	143.6	61.7	100	6/15	38	30	11.7
IDO1405S	---	---	139.5	60.6	100	6/13	39	3	10.4
WB6430	162.8	129.0	137.4	61.1	99	6/14	35	3	10.8
Tekoa	159.4	115.8	133.8	61.3	99	6/16	38	21	12.4
SY Saltese	---	---	131.8	61.1	100	6/12	38	53	12.3
UI Stone	183.1	130.6	116.8	59.7	100	6/14	37	13	10.6
12-SW-068	---	---	116.5	58.9	100	6/14	38	0	10.6
Diva	---	105.9	109.6	60.1	100	6/16	41	78	12.6
Louise	---	---	107.9	58.6	100	6/17	40	83	12.5
Alturas	147.8	121.0	102.8	60.1	100	6/15	38	0	10.3
WB 1035 CL	---	---	73.7	55.9	100	6/12	38	0	13.0
UI Pettit	150.3	115.7	69.0	55.3	99	6/12	35	0	10.5
Babe	156.1	118.9	60.4	52.9	99	6/15	38	20	12.5
Average	161.5	122.0	116.9	59.6	99	6/14	38	21	11.5
LSD ($\alpha=.05$)	13.5	10.6	10.6	1.0	2.9	0.7	3.1	25.1	
CV %	5.8	6.0	6.4	1.2	2.1	0.3	5.9	83.4	
Pr > F	0.0001	<.0001	<.0001	<.0001	0.6615	<.0001	0.0697	<.0001	

Table 45. Agronomic data for spring wheat, Idaho Falls, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
	2014	2015	2016						
Soft White Spring Wheat									
UI Stone	131.2	125.1	106.2	62.5	100	6/15	32	0	9.2
WB6430	115.1	103.8	105.3	62.8	100	6/15	30	0	9.2
SY Saltese	---	---	100.5	63.0	100	6/13	33	0	9.8
Alturas	99.4	114.4	98.3	62.0	100	6/20	35	0	8.5
12-SW-068	---	---	94.1	61.8	100	6/18	31	0	10.5
Babe	112.9	117.3	92.0	63.0	100	6/19	35	0	9.5
Diva	---	72.6	91.9	62.8	100	6/19	36	0	9.9
IDO1405S	---	---	90.9	61.5	100	6/17	32	0	9.2
UI Pettit	122.0	102.6	90.5	62.0	100	6/11	29	0	9.2
Louise	---	---	88.6	62.8	100	6/19	35	0	9.8
WB 1035 CL	---	---	87.5	62.5	100	6/16	31	0	10.1
Seahawk	105.4	88.6	85.9	62.8	100	6/19	34	0	8.8
WB6121	---	---	84.4	62.8	100	6/15	31	0	10.3
IDO1403S	---	---	84.3	62.8	100	6/18	31	0	9.7
Tekoa	105.5	97.9	77.4	63.5	100	6/21	34	0	9.2
Melba*	---	---	73.6	62.3	100	6/20	32	0	8.6
Average	113.7	104.6	91.5	62.5	100	6/17	32	0	9.5
LSD ($\alpha=.05$)	17.1	13.0	13.1	0.6	0.0	1.5	1.9	0.0	
CV %	10.5	8.7	10.1	0.7	0.0	0.6	4.1	.	
Pr > F	0.0241	<.0001	0.0002	<.0001	.	<.0001	<.0001	.	

Table 46. Agronomic data for spring wheat at Ashton, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
	2014	2015	2016						
Soft White Spring Wheat									
UI Stone	92.9	115.7	107.0	63.4	100	6/28	31	0	9.5
Melba*	---	---	104.1	63.2	100	7/2	30	0	9.0
WB6430	98.4	114.6	101.7	63.4	100	6/29	28	0	9.4
Seahawk	119.4	105.2	99.5	63.7	100	7/2	31	0	9.7
Alturas	105.3	110.6	99.1	62.7	100	6/30	31	0	9.6
Diva	---	111.6	96.4	63.0	100	7/2	34	0	9.6
UI Pettit	68.6	93.3	96.2	63.4	100	6/27	27	0	10.0
Louise	---	---	93.9	62.9	100	6/30	33	0	10.1
IDO1403S	---	---	93.2	62.9	100	7/1	31	0	10.2
12-SW-068	---	---	89.4	61.7	100	6/30	30	0	10.2
IDO1405S	---	---	88.9	62.3	100	6/28	30	0	10.1
Tekoa	91.5	105.3	87.4	63.9	100	7/1	32	0	8.8
Babe	68.2	94.1	87.3	63.2	100	7/1	32	0	9.5
WB 1035 CL	---	---	86.4	63.1	100	6/28	29	0	10.3
WB6121	---	---	84.0	63.4	100	6/28	27	0	11.0
Average	95.6	107.1	95.7	63.1	100	6/30	30	0	9.8
LSD ($\alpha=.05$)	16.3	10.8	10.3	0.6	0.0	1.1	1.7	0.0	
CV %	11.9	7.0	7.5	0.7	0.0	0.4	4.0	.	
Pr > F	<.0001	<.0001	<.0001	<.0001	.	<.0001	<.0001	.	

Table 47. Agronomic data for spring wheat at Soda Springs, dryland, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
	2014	2015	2016						
Soft White Spring Wheat									
UI Stone	38.6	70.2	43.3	60.6	99	7/1	23.5	0.0	11.6
Alturas	50.6	60.9	41.8	59.9	100	7/4	23.0	0.0	12.0
WB6430	---	62.1	38.2	60.8	99	7/2	20.8	0.0	12.4
12-SW-068	---	---	35.3	57.2	100	7/3	23.0	0.0	12.9
Melba*	---	---	34.8	58.6	98	7/5	22.3	0.0	13.9
Louise	---	---	34.6	58.5	100	7/3	26.3	0.0	12.8
WB 1035 CL	---	---	34.5	59.9	99	7/2	23.0	0.0	14.5
WB6121	---	---	33.6	60.6	99	7/2	21.8	0.0	12.7
UI Pettit	40.8	46.3	33.1	61.7	95	6/30	19.3	0.0	12.1
Seahawk	55.8	80.7	33.1	60.8	98	7/5	21.0	0.0	13.1
Diva	---	84.2	32.9	59.1	98	7/4	25.5	0.0	12.8
IDO1403S	---	---	32.5	59.3	99	7/4	22.0	0.0	13.3
Babe	38.9	45.7	31.9	59.8	100	7/4	24.8	0.0	12.4
Tekoa	52.5	79.6	30.7	60.2	84	7/6	23.3	0.0	13.0
IDO1405S	---	---	28.8	60.1	100	7/1	24.3	0.0	12.9
Average	44.9	62.9	34.6	59.8	98	7/3	22.9	0.0	12.8
LSD ($\alpha=.05$)	11.2	9.2	7.5	1.8	11.7	1.2	3.0	0.0	
CV %	30.8	10.2	15.1	2.1	8.4	0.5	9.3	.	
Pr > F	0.0756	<.0001	0.0251	0.0011	0.4712	<.0001	0.0030	.	

Table 48. Agronomic data for spring barley at Rupert, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
6- Row Spring Feed Barley												
Millennium	181.2	121.0	165.7	51.2	100	6/5	35	0	10.3	86.3	9.4	5.3
UTSB10905-72	---	---	153.3	51.5	100	6/5	38	0	10.1	98.0	1.9	0.8
Herald	170.3	110.3	146.5	51.4	100	6/9	37	0	10.1	94.2	4.8	1.8
Goldeneye	169.6	135.8	146.2	50.8	100	6/6	36	0	10.2	82.5	12.9	5.0
UTSB10902-91	---	---	133.6	51.1	100	6/10	36	0	10.2	97.2	2.6	1.3
6- Row Spring Malt Barley												
01Ab9663	137.4	101.4	136.7	53.4	100	6/10	41	0	9.8	96.4	3.1	1.5
Lacey	132.5	108.5	133.2	53.2	100	6/6	36	0	10.6	94.3	5.2	1.3
Celebration	132.6	101.9	119.8	51.5	100	6/9	35	0	10.8	95.5	3.8	1.3
Tradition	150.1	106.3	115.3	51.9	100	6/9	37	0	10.6	95.9	3.4	1.3
Quest	130.6	97.7	110.3	52.2	100	6/6	38	30	10.5	90.7	7.0	3.1
Average	150.4	111.2	137.6	51.8	100	6/7	37	3	10.3	93.1	5.4	2.3
LSD ($\alpha=.05$)	37.2	16.7	22.1	0.6	0.0	2.5	2.2	14.4				
CV %	17.2	10.3	11.1	0.8	0.0	1.1	4.2	400.0				
Pr > F	0.0331	0.0013	0.0002	<.0001	.	<.0001	0.0001	0.0071				

Table 49. Agronomic data for spring barley, Aberdeen, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
6-Row Spring Feed Barley												
Millennium	194.2	142.4	180.0	48.4	100	6/6	40	10	11.1	97.5	1.8	0.7
UTSB10902-91	---	---	173.5	48.2	100	6/12	35	58	11.2	93.9	4.8	2.3
UTSB10905-72	---	---	170.5	49.8	100	6/11	41	23	11.3	93.1	5.2	2.7
Goldeneye	136.0	145.7	161.5	49.6	100	6/7	42	9	11.4	83.7	11.7	5.7
Herald	151.2	137.1	148.5	48.6	98	6/12	38	31	11.2	87.9	7.8	5.7
6-Row Spring Malt Barley												
Lacey	138.9	119.9	145.2	50.6	100	6/12	42	20	11.7	94.9	3.5	2.4
01Ab9663	170.0	135.5	138.9	50.4	100	6/13	38	48	10.8	88.2	7.0	5.7
Tradition	125.5	123.7	132.7	50.5	100	6/11	41	35	11.6	95.1	4.2	1.6
Celebration	134.2	107.9	130.3	49.0	100	6/13	39	53	11.7	86.6	8.1	6.3
Quest	131.1	98.5	117.4	49.6	100	6/12	41	75	11.6	88.8	7.7	4.5
Average	144.7	127.0	151.3	49.5	100	6/10	40	37	11.4	91.1	6.2	3.8
LSD ($\alpha=.05$)	20.3	17.0	14.2	2.1	1.2	1.0	3.5	23.8				
CV %	9.8	9.2	6.5	2.9	0.9	0.4	6.0	44.4				
Pr > F	<.0001	<.0001	<.0001	0.2862	0.2354	<.0001	0.0092	<.0001				

Table 50. Agronomic data for spring barley at Idaho Falls, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
6 - Row Spring Feed Barley												
UTSB10905-72	---	---	135.5	51.8	100	6/16	33	0	10.7	96.7	2.2	1.1
UTSB10902-91	---	---	131.8	50.6	100	6/14	30	0	10.6	95.3	3.6	1.1
Goldeneye	140.1	132.6	123.6	50.5	100	6/13	34	0	10.2	81.7	13.0	5.3
Millennium	147.6	130.7	123.0	50.6	100	6/13	33	0	10.8	82.3	12.1	5.6
Herald	145.3	124.1	111.4	51.3	100	6/16	29	0	10.6	93.7	4.6	1.7
6 - Row Spring Malt Barley												
Tradition	134.8	132.6	111.7	52.2	100	6/15	30	0	11.0	95.1	4.1	0.8
01Ab9663	152.6	128.4	110.4	54.0	100	6/16	32	0	9.9	98.0	1.6	0.4
Lacey	130.0	144.7	105.5	52.6	100	6/16	29	0	11.2	96.1	3.2	0.7
Quest	128.8	133.4	97.3	52.3	100	6/17	32	0	11.0	92.7	5.3	2.0
Celebration	124.3	137.8	90.8	51.8	100	6/18	31	0	10.7	96.4	2.9	0.7
Average	139.6	135.5	113.5	51.7	100	6/15	31	0	10.7	92.8	5.3	1.9
LSD ($\alpha=0.05$)	18.3	8.5	16.9	0.7	0.0	1.5	2.3	4.2				
CV %	9.1	4.3	10.3	0.9	0.0	0.6	5.1	692.8				
Pr > F	<.0001	<.0001	0.0001	<.0001	.	<.0001	0.0001	0.4671				

Table 51. Agronomic data for spring barley at Ashton, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
6-Row Spring Feed Barley												
YU510-559	---	---	124.6	51.3	100	7/1	23	0	10.4	90.6	6.7	2.7
Millennium	112.5	131.8	117.2	52.5	100	6/28	29	0	10.3	82.3	13.4	4.3
UTSB10905-72	---	---	114.0	52.5	100	6/29	26	0	10.3	95.1	3.5	1.4
Goldeneye	91.7	132.3	112.8	52.3	100	6/28	28	0	10.3	79.9	15.1	5.0
UTSB10902-91	---	---	112.8	52.4	100	6/30	29	0	10.5	94.1	4.0	1.9
YU511-055	---	---	111.5	52.5	100	7/2	25	0	10.4	92.0	5.8	2.2
Herald	86.7	122.6	108.8	52.6	100	7/1	27	0	10.1	92.8	5.4	1.8
6-Row Spring Malt Barley												
01Ab9663	93.9	131.0	108.4	55.1	100	7/2	31	0	11.1	98.0	1.6	0.4
Quest	80.8	116.7	100.2	54.2	100	6/30	25	0	10.5	89.4	8.5	2.1
Lacey	92.6	110.7	97.8	54.5	100	6/29	28	0	10.6	96.0	3.4	0.6
Celebration	90.8	105.0	89.5	53.4	100	7/1	28	0	11.2	94.5	4.4	1.1
Tradition	99.4	100.9	81.1	54.3	100	6/30	29	0	10.5	95.5	3.7	0.8
Average	92.3	120.5	106.6	53.1	100	6/30	27	0	10.5	91.7	6.3	2.0
LSD ($\alpha=.05$)	13.2	15.5	12.0	0.5	0.0	1.4	5.7	0.0				
CV %	9.9	8.9	7.8	0.7	0.0	0.6	14.5	.				
Pr > F	0.0002	0.0006	<.0001	<.0001	.	<.0001	0.2795	.				

Table 52. Agronomic data for spring barley at Rupert, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
2-Row Spring Malt Barley												
LCS Odyssey	---	114.8	179.0	52.6	100	6/18	29	3	10.7	98.1	1.5	0.4
Idagold II	---	---	162.9	53.8	100	6/15	29	0	10.5	97.9	1.5	0.6
Merem	124.2	119.7	162.5	53.0	100	6/17	35	0	10.0	96.2	2.8	1.0
Moravian 150	---	---	161.1	53.4	100	6/17	27	0	10.6	97.4	1.7	0.9
Moravian 169	---	---	161.1	54.6	100	6/14	26	0	10.7	99.0	0.6	0.4
ABI Voyager	142.0	129.0	157.1	53.0	100	6/12	34	15	10.1	98.1	1.5	0.4
2B10-4378	---	---	156.6	54.0	100	6/11	30	0	10.5	97.9	1.4	0.7
2Ab07-X031098-31	148.1	141.7	156.5	54.1	100	6/12	33	0	10.3	96.7	2.3	1.0
2Ab04-X01084-27	143.9	114.3	155.7	52.2	100	6/12	30	23	9.9	94.7	3.2	2.1
2Ab08-X05M010-82	149.6	113.8	154.1	54.2	100	6/15	35	11	10.2	96.3	2.7	1.0
LCS Westminster	---	---	153.3	52.5	100	6/17	29	3	10.9	98.1	1.5	0.4
CDC Copeland	138.6	114.9	153.2	52.9	100	6/14	35	5	10.5	97.7	1.5	0.8
ABI Balster	144.5	128.1	152.8	52.5	100	6/12	32	10	10.5	96.6	2.2	1.2
LCS Genie	146.7	107.7	152.5	52.9	100	6/18	27	0	10.8	96.1	2.8	1.1
Moravian 69	151.8	110.2	151.1	52.9	100	6/17	27	0	9.9	97.3	1.6	1.1
ABI Growler	148.4	122.8	150.4	52.8	100	6/13	32	0	10.2	97.5	1.5	1.0
2B10-4162	---	---	150.4	54.4	100	6/12	30	3	10.5	93.9	4.8	1.3
ACC Synergy	---	150.7	147.1	52.7	100	6/12	33	0	10.2	98.2	1.2	0.6
CDC Meredith	144.7	109.3	145.3	52.5	100	6/16	33	3	10.2	97.2	2.0	0.8
Conrad	135.3	132.4	140.6	54.0	100	6/13	32	0	9.9	98.3	1.2	0.5
AC Metcalfe	137.8	111.3	135.1	52.9	100	6/12	33	8	10.1	97.1	2.1	0.8
Hockett	127.0	109.4	125.1	53.8	100	6/12	30	23	10.6	96.9	1.9	1.2
Harrington	123.8	100.8	124.6	53.0	100	6/15	35	55	10.2	92.4	5.5	2.1
ND Genesis	---	113.8	115.6	53.8	100	6/11	36	0	10.4	96.1	2.7	1.2
Average	140.2	118.6	150.2	53.3	100	6/14	31	7	10.3	96.9	2.2	0.9
LSD ($\alpha=.05$)	21.0	22.8	18.0	0.6	0.0	1.1	2.7	23.3				
CV %	10.6	13.6	8.5	0.8	0.0	0.5	6.2	249.9				
Pr > F	0.2213	0.0064	<.0001	<.0001	.	<.0001	<.0001	0.0050				

Table 53. Agronomic data for spring barley, Aberdeen, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
2-Row Spring Malt Barley												
LCS Odyssey	---	164.5	164.8	50.0	100	6/18	34	50	11.8	87.3	8.1	4.6
Moravian 169	---	---	164.2	53.7	99	6/17	33	8	12.0	96.5	1.8	1.7
Moravian 69	151.0	130.7	163.3	51.7	100	6/19	34	6	11.3	89.4	6.3	4.3
Moravian 150	---	---	162.3	51.3	100	6/17	34	3	11.4	94.0	3.5	2.5
LCS Genie	167.9	157.4	159.6	52.3	98	6/18	33	13	11.9	88.1	7.3	4.6
Idagold II	---	---	158.4	52.9	99	6/16	38	0	11.3	91.7	5.1	3.2
2Ab08-X05M010-82	143.0	140.4	155.0	52.4	90	6/16	38	38	11.3	92.6	4.5	2.9
2B10-4378	---	---	149.2	53.0	99	6/14	35	34	12.0	93.2	4.5	2.3
2B10-4162	---	---	147.9	53.1	100	6/14	35	31	12.0	88.0	7.1	4.9
2Ab04-X01084-27	128.3	136.0	146.6	51.1	93	6/14	34	55	11.3	90.0	5.8	4.2
LCS Westminster	---	---	146.6	52.2	100	6/19	35	30	11.7	93.4	4.3	2.3
ABI Balster	156.5	136.6	144.7	50.2	100	6/14	35	30	11.6	84.8	7.5	7.7
CDC Copeland	143.3	126.8	143.6	51.8	100	6/15	41	40	11.6	90.6	5.3	4.1
ABI Voyager	145.3	144.2	143.4	50.7	99	6/14	38	37	11.2	89.3	5.8	4.9
2Ab07-X031098-31	127.6	140.3	141.4	52.1	87	6/15	36	25	12.0	85.9	8.5	5.6
Conrad	138.0	138.4	138.1	51.8	99	6/15	36	60	11.6	84.8	7.9	7.3
AC Metcalfe	136.3	111.1	137.0	52.5	100	6/14	40	23	11.5	90.5	5.0	4.5
ACC Synergy	---	161.2	135.1	52.2	100	6/14	39	40	11.1	93.8	3.5	2.7
Harrington	121.0	106.0	132.1	52.3	100	6/16	36	73	11.6	84.1	9.5	6.4
Merem	128.0	122.1	130.2	49.8	100	6/18	39	34	11.4	80.2	9.8	10.0
ABI Growler	136.6	138.6	127.5	50.6	100	6/15	36	40	11.7	85.9	7.0	7.1
CDC Meredith	137.6	92.7	124.9	49.3	98	6/17	37	68	11.7	81.1	10.4	8.5
ND Genesis	---	136.5	124.5	53.2	93	6/12	39	6	11.3	91.8	4.7	3.5
Hockett	141.7	127.9	118.8	52.1	100	6/12	34	88	12.0	88.3	6.7	5.0
Average	142.0	134.4	144.1	51.7	98	6/15	36	35	11.6	89.0	6.2	4.8
LSD ($\alpha=.05$)	27.7	22.5	21.7	1.5	5.2	1.2	3.0	26.9				
CV %	13.7	11.8	10.7	2.0	3.8	0.5	5.8	55.4				
Pr > F	0.1016	<.0001	0.0001	.	<.0001	<.0001	<.0001	<.0001				

Table 54. Agronomic data for spring barley at Idaho Falls, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
2-Row Spring Malt Barley												
LCS Odyssey	---	110.5	138.6	51.6	100	6/27	23	0	10.9	93.7	4.1	2.2
ABI Voyager	141.1	129.4	134.2	53.6	100	6/21	28	0	10.5	98.9	0.6	0.5
2B10-4378	---	---	128.1	54.4	100	6/22	26	0	10.7	96.0	2.7	1.3
2Ab04-X01084-27	130.4	114.0	127.5	52.0	100	6/23	24	0	10.1	95.6	3.1	1.3
2Ab08-X05M010-82	140.0	97.3	124.5	53.1	100	6/23	25	0	10.1	94.6	3.9	1.5
Conrad	129.1	106.3	121.7	53.2	100	6/23	25	0	10.3	98.2	1.2	0.6
2Ab07-X031098-31	141.8	144.4	119.5	54.1	100	6/22	27	0	10.8	95.9	2.9	1.2
ACC Synergy	---	144.3	118.0	53.3	100	6/23	26	0	10.8	98.8	0.9	0.3
LCS Genie	147.1	84.2	116.8	53.1	100	6/26	20	0	10.8	95.6	3.2	1.2
LCS Westminster	---	---	116.5	53.4	100	6/23	22	0	10.7	97.7	1.3	1.0
2B10-4162	---	---	115.3	53.9	100	6/23	22	0	10.6	91.2	6.1	2.7
ABI Growler	161.7	125.9	114.5	52.5	100	6/24	26	0	10.4	96.8	2.3	0.9
Moravian 69	125.6	102.6	114.2	52.3	100	6/25	20	0	10.3	94.9	3.5	1.6
Idagold II	---	---	113.9	53.6	100	6/24	23	0	10.4	96.0	3.0	1.0
Hockett	121.2	111.9	113.7	53.5	100	6/21	23	3	10.6	94.7	3.3	2.0
AC Metcalfe	122.5	115.4	110.3	53.7	100	6/21	28	0	10.4	96.8	2.0	1.2
Moravian 150	---	---	109.8	52.6	100	6/26	20	0	10.6	97.3	2.0	0.7
Merem	125.8	121.4	109.4	52.5	100	6/26	26	0	10.5	95.2	3.6	1.2
CDC Copeland	135.8	124.4	109.3	52.6	100	6/24	27	0	10.7	96.8	2.2	1.0
Harrington	117.2	111.8	108.6	53.5	100	6/24	25	0	10.4	93.6	5.1	1.3
ABI Balster	138.3	139.9	108.4	52.8	100	6/25	22	0	10.5	97.1	2.2	0.7
CDC Meredith	133.5	126.2	104.0	52.4	100	6/24	27	0	10.4	96.5	2.7	0.8
ND Genesis	---	123.7	103.5	53.4	100	6/21	27	0	10.5	95.8	3.1	1.1
Moravian 169	---	---	102.3	54.7	100	6/25	20	0	10.7	98.4	0.5	1.1
Average	135.5	116.2	115.9	53.1	100	6/24	24	0	10.5	96.1	2.7	1.2
LSD ($\alpha=.05$)	19.3	18.5	14.5	0.9	0.0	1.8	2.6	1.4				
CV %	10.0	11.3	8.8	1.2	0.0	0.7	7.7	979.8				
Pr > F	0.0025	<.0001	<.0001	<.0001	.	<.0001	<.0001	0.4773				

Table 55. Agronomic data for spring barley at Ashton, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
2-Row Spring Malt Barley												
LCS Genie	74.0	134.3	132.0	55.8	100	7/3	25	0	10.6	98.3	1.1	0.6
LCS Westminster	---	---	124.9	55.3	100	7/5	24	0	10.9	98.4	0.8	0.8
LCS Odyssey	---	143.6	124.5	54.5	100	7/5	23	0	10.5	97.9	1.5	0.6
Moravian 150	---	---	123.9	55.3	100	7/3	23	0	10.7	97.6	1.7	0.7
2B10-4162	---	---	123.1	55.8	100	7/3	24	0	10.7	91.0	6.9	2.1
2Ab08-X05M010-82	86.2	142.3	121.0	54.9	100	7/4	25	0	10.3	94.6	3.3	2.1
ABI Voyager	---	127.8	120.5	54.7	100	7/3	26	0	10.4	99.0	0.6	0.4
Idagold II	---	---	119.7	55.3	100	7/4	24	0	10.4	96.8	2.4	0.8
Merem	90.8	137.8	117.2	54.3	100	7/6	28	0	10.4	93.4	4.7	1.9
CDC Meredith	83.9	130.1	116.6	53.9	100	7/4	25	0	10.3	96.1	2.8	1.1
2Ab04-X01084-27	84.4	151.2	115.5	53.6	100	7/3	23	0	10.6	96.2	2.4	1.4
CDC Copeland	81.7	128.7	115.2	53.6	100	7/3	27	0	10.5	94.7	4.2	1.1
2Ab07-X031098-31	87.1	135.8	113.6	55.1	100	7/3	25	0	10.6	93.8	4.6	1.6
Moravian 169	---	---	113.2	55.6	100	7/3	23	0	11.1	99.0	0.4	0.6
2B10-4378	---	---	113.1	55.7	100	7/3	24	0	10.6	96.0	3.1	0.9
AC Metcalfe	75.6	127.6	112.3	55.4	100	7/3	26	0	10.4	97.5	1.7	0.8
ND Genesis	---	118.1	111.6	55.5	100	7/3	27	0	10.3	97.9	1.6	0.5
ABI Balster	93.0	135.1	111.5	54.3	100	7/3	25	0	10.4	97.0	2.2	0.8
Hockett	89.8	118.1	111.5	56.0	100	7/3	25	0	10.7	98.1	1.4	0.5
Harrington	60.3	113.5	110.0	55.8	100	7/3	26	0	10.6	93.4	5.4	1.2
Conrad	85.8	134.4	108.5	54.4	100	7/4	24	0	10.3	97.4	1.9	0.7
ACC Synergy	---	128.3	108.1	54.9	100	7/3	25	0	10.4	97.9	1.5	0.6
ABI Growler	79.9	139.9	107.4	54.2	100	7/3	24	0	10.4	97.1	2.1	0.8
Average	83.1	134.3	116.1	55.0	100	7/3	25	0	10.5	96.5	2.5	1.0
LSD ($\alpha=.05$)	15.7	16.2	11.8	0.7	0.3	0.5	1.9	0.0				
CV %	13.0	8.5	7.2	0.9	0.2	0.2	5.6	.				
Pr > F	0.0024	<.0001	0.0041	<.0001	0.4773	<.0001	<.0001	.				

Table 56. Agronomic data for spring barley at Soda Springs, dryland, 2016.

Variety	Test Wt.		Spring	Heading	Height	Lodging	Protein	Plump		
	2016	(lb/bu)	Stand %	Date	(in.)	(%)	(%)	(>6/64)	(>5.5/64)	% Thin
2-Row Spring Malt Barley										
LCS Odyssey	52.6	52.0	100	7/8	20	0	10.3	93.7	4.8	1.5
2Ab07-X031098-31	48.7	51.0	99	7/8	19	0	10.4	74.6	19.0	6.4
Conrad	47.0	52.0	100	7/8	21	0	10.0	93.7	4.8	1.5
2B10-4162	46.1	51.0	100	7/6	21	0	11.0	60.4	26.8	12.8
2Ab04-X01084-27	44.3	47.0	100	7/8	17	0	9.9	85.2	11.5	3.3
2Ab08-X05M010-82	43.7	50.0	97	7/8	19	0	10.2	78.8	14.4	6.8
Idagold II	43.7	53.0	100	7/8	19	0	10.2	85.1	11.9	3.0
LCS Genie	42.7	52.0	100	7/8	18	0	10.6	95.9	3.2	0.9
LCS Westminster	41.6	52.0	98	7/7	23	0	10.6	96.7	2.3	1.0
Hockett	40.9	53.0	100	7/6	21	0	10.1	91.5	6.3	2.2
Moravian 169	40.3	50.0	100	7/6	17	0	11.3	94.4	4.3	1.3
Harrington	38.5	50.0	100	7/7	20	0	10.8	64.7	24.7	10.6
ABI Voyager	37.8	51.0	100	7/7	21	0	10.0	93.9	4.8	1.3
ACC Synergy	37.0	50.0	98	7/6	21	0	10.6	87.2	9.3	3.5
CDC Copeland	35.7	50.0	100	7/8	21	0	10.3	90.2	7.6	2.2
CDC Meredith	35.7	49.0	99	7/8	20	0	10.4	79.1	14.7	6.2
ABI Growler	35.0	49.0	100	7/7	19	0	10.4	77.9	15.3	6.8
ND Genesis	34.4	52.0	100	7/6	22	0	10.1	87.7	9.8	2.5
Moravian 69	34.0	50.0	98	7/8	17	0	9.9	87.7	9.6	2.7
ABI Balster	32.5	48.0	99	7/8	19	0	10.4	77.1	16.4	6.5
Merem	29.7	49.0	100	7/9	20	0	10.8	63.5	21.1	15.4
2B10-4378	29.3	51.0	100	7/6	17	0	10.8	79.4	14.2	6.4
AC Metcalfe	26.3	50.0	100	7/8	23	0	10.3	81.9	13.9	4.2
Moravian 150	24.8	50.0	98	7/8	17	0	10.4	89.3	7.4	3.3
Average	38.4	50.5	99	7/7	19	0	10.4	83.7	11.6	4.7
LSD ($\alpha=.05$)	15.0	1.9	3.1	1.6	2.9	0.0				
CV %	18.9	1.8	1.5	0.4	7.1	.				
Pr > F	0.0639	<.0001	0.3887	0.0172	0.0020	.				

Table 57. Agronomic data for spring barley at Rupert, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
2-Row Spring Feed Barley												
Claymore	---	150.4	163.8	53.4	100	6/13	33	20	9.8	92.3	4.9	2.8
Harriman	149.9	129.4	163.5	54.1	100	6/16	34	0	9.7	96.4	2.7	0.9
Oreana	---	112.0	157.6	54.3	100	6/18	26	0	10.0	91.5	5.5	3.0
Idagold II	155.5	109.8	157.0	54.2	100	6/14	30	0	10.4	94.6	3.3	2.1
Altorado	---	---	156.7	55.1	100	6/13	31	0	9.9	93.7	4.2	2.1
Vespa	175.2	159.8	156.3	54.3	100	6/17	27	0	10.2	96.4	2.2	1.4
Baronesse	127.8	103.3	151.7	54.6	100	6/13	31	3	9.8	96.3	2.2	1.5
Lenetah	162.9	123.7	151.2	55.0	100	6/15	34	0	10.1	95.5	2.7	1.8
RWA 1758	155.8	107.7	150.6	55.4	100	6/12	29	1	10.0	96.9	2.1	1.0
Kardia	138.9	86.6	150.5	52.7	100	6/17	34	0	10.0	92.5	5.1	2.4
Xena	157.7	108.6	149.8	54.6	100	6/12	33	20	10.1	95.9	2.5	1.6
Sawtooth*	120.6	97.2	136.7	61.5	100	6/16	35	0	11.3	84.5	10.9	4.6
Julie*	116.8	95.6	136.4	61.7	100	6/17	34	0	11.4	92.0	4.7	3.3
Champion	161.3	116.5	133.9	55.1	100	6/12	32	0	10.2	90.9	5.6	3.5
Clearwater*	105.2	80.7	123.5	61.7	100	6/13	32	8	12.1	91.0	5.9	3.1
2Ab09-X06F058HL-31*	102.1	80.2	115.7	62.4	100	6/14	32	30	11.7	89.9	8.6	1.5
Transit*	103.4	74.3	107.0	60.4	100	6/14	33	23	11.9	85.7	11.2	3.1
CDC Fibar*	97.3	78.7	92.8	60.4	100	6/15	34	85	9.9	88.6	9.3	2.1
Average	136.3	107.8	141.9	56.7	100	6/14	32	10	10.5	92.5	5.2	2.3
LSD ($\alpha=.05$)	20.7	23.2	13.3	0.7	0.0	1.3	3.0	28.3				
CV %	10.7	15.2	6.6	0.8	0.0	0.6	6.6	190.1				
Pr > F	<.0001	<.0001	<.0001	<.0001	.	<.0001	<.0001	<.0001				

* indicates hulless variety

Table 58. Agronomic data for spring barley, Aberdeen, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
2-Row Spring Feed Barley												
Altorado	---	---	182.2	53.1	100	6/13	35	30	11.6	93.9	3.8	2.3
Vespa	163.1	153.8	170.6	52.7	98	6/16	35	16	11.5	93.9	3.6	2.5
Baronesse	132.0	144.7	162.1	52.6	100	6/15	37	38	10.8	92.1	4.5	3.4
Oreana	---	155.4	161.3	51.8	100	6/18	33	70	11.4	85.0	10.1	4.9
Harriman	140.9	139.2	158.8	52.0	99	6/17	37	15	11.0	93.3	4.5	2.2
Champion	163.0	145.3	156.3	52.2	100	6/13	37	48	11.6	86.2	6.6	7.2
Idagold II	167.4	141.3	155.3	51.8	99	6/15	34	18	11.6	87.9	7.0	5.1
Xena	146.8	150.2	150.8	52.4	100	6/13	38	43	11.2	92.4	4.8	2.8
Lenetah	137.4	146.2	149.0	52.4	100	6/14	39	48	11.5	90.3	6.3	3.4
RWA 1758	154.9	125.4	145.1	52.0	100	6/14	38	33	10.8	88.1	6.4	5.5
Kardia	135.4	138.9	144.8	50.7	100	6/19	37	40	11.6	89.5	6.7	3.8
Claymore	---	164.5	138.7	50.0	100	6/14	40	60	11.1	80.8	10.1	9.1
Clearwater*	120.8	97.2	120.9	57.3	98	6/15	37	58	16.0	81.6	11.7	6.7
Julie*	131.3	121.3	118.9	57.0	100	6/19	37	33	16.4	89.6	6.4	4.0
2Ab09-X06F058HL-31*	103.9	103.1	111.3	57.5	90	6/16	35	55	16.3	91.4	6.0	2.6
Transit*	109.6	103.5	104.8	56.9	98	6/18	41	23	15.7	78.4	14.3	7.3
Sawtooth*	127.3	100.1	103.2	55.7	71	6/18	38	20	12.7	75.9	14.5	9.6
CDC Fibar*	107.5	95.9	102.4	57.0	85	6/16	41	45	15.2	83.9	11.5	4.6
Average	135.7	131.6	140.9	53.6	97	6/16	37	38	12.7	87.5	7.7	4.8
LSD ($\alpha=0.05$)	19.7	20.4	19.8	1.5	6.4	1.2	3.9	28.8				
CV %	10.2	10.9	9.9	1.9	4.7	0.5	7.4	53.0				
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0116	0.0044				

* indicates hulless variety

Table 59. Agronomic data for spring barley at Idaho Falls, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
2-Row Spring Feed Barley												
Xena	129.1	147.2	135.9	53.8	100	6/23	28	0	10.3	96.5	2.6	0.9
Baronesse	120.4	125.7	131.2	53.8	100	6/24	25	0	9.9	95.8	3.2	1.0
Kardia	121.1	125.9	131.2	51.5	100	6/25	27	0	10.8	89.5	7.6	2.9
Claymore	---	139.0	130.7	52.9	100	6/23	28	0	10.1	94.8	3.8	1.4
Lenetah	132.3	148.1	124.9	54.0	100	6/25	29	0	10.2	96.9	2.3	0.8
Harriman	164.3	134.8	123.9	53.2	100	6/26	27	0	9.9	95.3	3.6	1.1
Vespa	157.2	127.6	121.4	53.5	100	6/26	23	0	10.4	97.1	1.8	1.1
Oreana	---	89.4	118.7	53.1	99	6/27	23	0	10.6	89.3	7.3	3.4
Champion	152.5	153.5	117.6	54.8	100	6/21	26	0	10.6	92.5	5.3	2.2
Altorado	---	---	116.6	54.2	100	6/23	27	0	10.3	95.1	3.8	1.1
Idagold II	144.6	99.4	112.3	53.7	100	6/24	23	0	10.4	96.0	3.1	0.9
RWA 1758	130.7	123.8	111.6	53.8	100	6/23	25	0	10.2	95.5	3.0	1.5
Julie*	126.8	117.8	107.6	60.4	100	6/26	29	0	13.8	91.0	7.3	1.7
2Ab09-X06F058HL-31*	96.4	97.6	100.8	62.2	100	6/22	28	0	13.3	92.8	5.3	1.9
Sawtooth*	135.5	118.2	94.5	60.0	98	6/26	29	0	12.6	86.0	11.0	3.0
Clearwater*	100.2	102.3	94.2	61.7	100	6/25	25	0	12.6	90.3	6.9	2.8
Transit*	112.2	103.0	90.0	59.0	100	6/25	29	0	13.8	84.3	12.1	3.6
CDC Fibar*	82.2	103.9	84.3	60.2	100	6/21	29	0	14.5	90.2	7.8	2.0
Average	128.4	125.4	113.7	55.9	100	6/24	26	0	11.3	92.7	5.4	1.9
LSD ($\alpha=.05$)	21.0	14.6	16.8	0.9	1.1	2.0	2.7	0.0				
CV %	11.5	8.2	10.4	1.1	0.8	0.8	7.2	.				
Pr > F	<.0001	<.0001	<.0001	<.0001	0.0077	<.0001	<.0001	.				

* indicates hulless variety

Table 60. Agronomic data for spring barley at Ashton, irrigated, 2016.

Variety	Yield (bu/A)			Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump		
	2014	2015	2016							(>6/64)	(>5.5/64)	% Thin
2-Row Spring Feed Barley												
Oreana	---	132.5	149.2	55.5	100	7/4	23	0	10.3	93.4	5.0	1.6
Altorado	---	---	138.8	56.3	100	7/3	26	0	10.3	91.0	7.1	1.9
Xena	123.3	139.3	138.0	55.4	100	7/3	27	0	10.8	93.7	4.6	1.7
Champion	134.6	124.0	137.9	56.9	100	7/3	26	0	10.4	95.7	3.0	1.3
Vespa	109.9	142.4	136.0	55.0	100	7/4	23	0	10.2	97.3	1.6	1.1
RWA 1758	129.4	122.6	133.3	55.8	100	7/4	24	0	10.8	96.4	2.2	1.4
Lenetah	121.0	133.7	131.0	56.1	100	7/3	28	0	10.7	97.6	1.8	0.6
Claymore	---	144.8	130.6	54.1	100	7/4	26	0	10.8	92.3	5.4	2.3
Baronesse	119.9	107.1	127.1	55.6	100	7/3	23	0	10.4	96.6	2.2	1.2
Harriman	106.0	116.5	125.4	54.9	100	7/6	22	0	10.9	95.6	1.1	3.3
Kardia	114.9	135.3	123.8	53.4	100	7/5	28	0	11.1	92.0	5.7	2.3
Idagold II	96.4	117.4	120.8	55.1	100	7/4	25	0	10.7	94.9	3.9	1.2
Clearwater*	71.6	92.7	109.7	61.9	100	7/3	26	0	10.6	92.3	5.5	2.2
Sawtooth*	69.5	125.5	107.8	61.5	96	7/4	26	0	10.7	86.3	10.7	3.0
Julie*	102.0	98.7	106.5	61.1	100	7/6	29	0	12.4	93.8	4.9	1.3
2Ab09-X06F058HL-31*	66.0	95.5	99.3	63.9	100	7/3	26	0	11.6	95.9	3.4	0.7
Transit*	69.9	95.9	84.6	60.2	100	7/4	28	0	12.6	90.9	7.5	1.6
CDC Fibar*	57.3	102.2	83.4	61.9	100	7/3	29	0	13.2	94.6	4.1	1.3
Average	101.2	121.5	121.3	57.5	100	7/3	26	0	11.0	93.9	4.4	1.7
LSD ($\alpha=.05$)	14.3	25.7	14.1	0.6	0.9	0.3	3.9	0.0				
CV %	10.0	14.9	8.2	0.7	0.6	0.1	10.6	.				
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0051	.				

* indicates hulless variety

Table 61. Hard Winter Wheat Yield Percentage of Location Averages, 2016.

Variety	(100% =Average)						Soda Springs	Variety Average
	Kimberly	Aberdeen	Rupert	Ririe	Rockland			
LCS Jet	108	147	119	114	141	---	126	
UI SRG	---	---	---	108	120	---	114	
Norwest 553	103	133	113	93	126	110	113	
Curlew	---	---	---	115	107	---	111	
Keldin	103	91	124	121	111	113	110	
Juniper	---	---	---	103	117	---	110	
OR2110679 (W)	103	122	95	96	123	107	108	
UICF Grace (W)	---	---	---	97	117	---	107	
Promontory	---	---	---	102	112	---	107	
OR2120276H (W)	101	129	103	94	115	98	107	
Yellowstone	106	97	105	108	111	111	106	
SY Touchstone (W)	94	126	116	89	---	---	106	
OR2111025 (W)	102	126	94	94	109	109	106	
OR2110664 (W)	100	125	89	100	116	99	105	
IDO1101 (W)	101	94	105	106	109	111	105	
LCI 13DH22-22 (W)	94	88	116	115	107	107	104	
WA8252 (W)	105	107	93	102	113	---	104	
Golden Spike (W)	---	---	---	109	97	---	103	
Whetstone	107	94	108	99	---	---	102	
SY Clearstone CL2	93	90	96	117	108	107	102	
OR2120012R	100	116	105	84	104		102	
Colter	97	88	110	101	114	101	102	
UI Silver (W)	102	77	94	111	124	100	101	
Utah 100	104	95	84	103	129	92	101	
Loma	106	101	106	93	89	101	99	
WB3768 (W)	99	92	90	109	108	97	99	
Northern	101	95	91	106	103	86	97	
Greenville	102	97	100	94	99	87	96	
Judee	102	102	83	97	99	94	96	
LCS Colonia	94	100	104	93	77	107	96	
Manning	91	86	88	98	108	94	94	
LCI 13DH04-16 (W)	91	88	95	95	86	107	94	
Warhorse	89	101	76	86	94	108	92	
Judee/Garland	---	---	---	93	88	---	91	
Deloris	---	---	---	101	76	---	88	
Lucin-CL	---	---	---	97	75	---	86	
LCI13DH14-83 (W)	107	75	104	99	27	96	85	
LCI 13DH14-53 (W)	100	68	106	97	28	88	81	
Garland	94	50	88	88	72	70	77	
Bearpaw	---	---	---	75	49	---	62	
Location Average (bu/A)	157	113	84	42	43	91		

All varieties are Hard Red Winter unless annotated.
(W) = Hard White

Table 62. Soft White Winter Wheat Yield Percentage of Location Averages, 2016.

	(100% =Average)				Soda Springs	Variety Average
	Kimberly	Aberdeen	Rupert	Ririe		
LCS Drive	106	126	118	---	---	116
WB 1783	104	134	104	112	---	114
SY Ovation	104	116	106	124	---	113
Otto	---	---	---	112	---	112
SY Assure	106	113	114	---	---	111
LWW14-73163	101	117	101	115	116	110
WA8232	122	117	93	103	104	108
BZ6W09-489	108	96	111	116	---	108
Jasper	111	107	93	115	106	106
IDN-02-29001A	108	110	95	98	119	106
WB1529	103	98	115	---	---	105
WB-528	107	98	109	---	---	105
LCS Biancor	91	106	113	---	---	103
WA8234	106	106	106	97	99	103
Norwest Duet	100	107	95	109	---	103
LCS Artdeco	97	99	112	---	---	103
Norwest Tandem	100	110	101	100	98	102
IDN07-28017B	98	109	95	---	---	101
LOR-913	106	95	100	---	---	100
WB 456	101	98	101	---	---	100
LOR-833	95	111	103	83	104	99
Bobtail	97	104	101	92	98	99
OR2110526	93	96	107	93	104	99
LWW10-1073	---	---	---	98	---	98
WB1376CLP	98	98	100	96	96	98
UI Sparrow	108	91	86	103	98	97
IDN06-03303B	89	96	105	---	---	97
UI Castle	90	99	95	100	99	97
IDN-01-10704A	90	99	88	108	97	96
Bruneau	105	91	96	91	98	96
IDN06-18102A	101	99	87	---	---	96
UI-WSU Huffman	98	94	88	100	94	95
Eltan	---	---	---	95	---	95
WA8206	96	91	88	87	108	94
UI Magic	90	83	103	93	95	93
UI Palouse	95	89	93	98	85	92
Stephens	97	81	89	100	85	90
SY 107	---	---	---	90	---	90
Madsen	93	76	88	88	96	88
Brundage	87	39	99	77	---	75
Location Average (bu/A)	141	137	90	44	93	

Table 63. Winter Barley Yield Percentage of Location Averages, 2016.

	(100% =Average)		Variety Average
	Aberdeen	Rupert	
04ARS635-4	126	103	115
UTWB10201-15	117	108	113
TCFW6-140	107	117	112
Alba	116	107	111
Lightning	118	102	110
Thunder	117	101	109
Endeavor	111	103	107
02Ab669	104	105	104
Strider	100	108	104
02Ab671	94	110	102
Charles	108	96	102
Streaker*	103	97	100
02Ab431	94	107	100
WintMalt	100	100	100
Sprinter	92	103	98
05ARS561-208	100	94	97
Kamiak	102	92	97
Eight-Twelve	81	110	95
Maja	90	99	95
Sunstar Pride	91	94	92
Buck*	88	96	92
Schuyler	80	103	91
05ARS748-270*	96	74	85
Verdant	65	69	67
Location Average (bu/A)	140	132	

* indicates hulless variety

Table 64. Hard Spring Wheat Yield Percentage of Location Averages, 2016.

Variety	(100% =Average)				Soda Springs	Variety Average
	Aberdeen	Rupert	Idaho Falls	Ashton		
Dayn (W)	133	124	108	107	131	120
SY Basalt	123	111	107	---	---	113
WA8240	119	118	109	107	---	113
SY-Teton (W)	112	112	102	---	122	112
Alum	101	106	104	105	142	112
LCS Star (W)	126	112	101	103	105	109
IDO1202S (W)	87	106	91	122	139	109
Cabernet	118	105	109	104	---	109
SY3015-8	122	93	110	---	---	108
UI Platinum (W)	111	108	96	105	111	106
Bullseye	91	107	104	122	---	106
LCS Iron	127	103	99	111	88	106
SY Coho	116	111	89	---	---	105
IDO1203-A (W)	83	95	120	110	115	105
SY Selway	---	---	---	---	104	104
IDO1602S	110	110	104	97	95	103
Alzada (D)	113	106	97	92	---	102
WB9411	116	106	112	95	78	102
WB7589 (W)	113	100	100	103	86	101
HRS 3419	108	103	91	98	---	100
Jefferson	71	98	106	104	118	99
WB7328 (W)	97	96	115	89	94	98
WB9200	120	102	105	88	74	98
LCS Luna	108	104	91	101	84	98
WB9668	121	96	97	93	75	96
WA8262	97	97	94	98	---	96
LCS Atomo (W)	95	96	91	104	85	94
Kelse	85	84	89	102	105	93
WB-Paloma (W)	76	90	104	101	---	93
WB9518	121	98	87	90	67	93
HRS 3504	69	97	93	110	---	92
Klasic (W)	66	85	108	96	99	91
WB9377	75	94	96	102	82	90
HRS 3616	87	91	86	76	---	85
Snow Crest (W)	63	76	95	90	---	81
HRS 3530	54	79	94	94	---	80
Location Average (bu/A)	121	125	88	88	22	

All varieties are Hard Red Spring unless annotated.

(W) = Hard White

(D) = Durum

Table 65. Soft White Spring Wheat Yield Percentage of Location Averages, 2016.

	(100% =Average)				Soda	Variety Average
	Aberdeen	Rupert	Idaho Falls	Ashton	Springs	
UI Stone	100	108	116	112	125	112
WB6430	117	108	115	106	110	111
SY Saltese	113	103	110	---	---	108
Seahawk	124	107	94	104	96	105
Alturas	88	101	107	104	121	104
Melba*	123	104	80	109	100	103
IDO1403S	123	103	92	97	94	102
WB6121	129	97	92	88	97	101
IDO1405S	119	107	99	93	83	100
12-SW-068	100	99	103	93	102	99
Louise	92	103	97	98	100	98
Diva	94	99	100	101	95	98
Tekoa	114	99	85	91	89	96
UI Pettit	59	89	99	101	96	89
WB 1035 CL	63	82	96	90	100	86
Babe	52	92	101	91	92	86
Location Average (bu/A)	117	124	91	96	35	

* indicates club variety

Table 66. 6-Row Spring Barley Yield Percentage of Location Averages, 2016.

	(100% =Average)				Variety
	Aberdeen	Rupert	Idaho Falls	Ashton	Average
Feed					
YU510-559	---	---	---	117	117
Millennium	119	120	108	110	114
UTSB10905-72	113	111	119	107	113
UTSB10902-91	115	97	116	106	108
Goldeneye	107	106	109	106	107
YU511-055	---	---	---	105	105
Herald	98	106	98	102	101
Malt					
01Ab9663	92	99	97	102	98
Lacey	96	97	93	92	94
Tradition	88	84	98	76	87
Quest	78	80	86	94	84
Celebration	86	87	80	84	84
Location Average (bu/A)	151	138	113	107	

Table 67. 2-Row Spring Malt Barley Yield Percentage of Location Averages, 2016.

	(100% =Average)				Soda Springs	Variety Average
	Aberdeen	Rupert	Idaho Falls	Ashton		
LCS Odyssey	114	119	120	107	137	119
LCS Genie	111	102	101	114	111	108
2Ab08-X05M010-82	108	103	107	104	114	107
Idagold II	110	109	98	103	114	107
2Ab04-X01084-27	102	104	110	99	115	106
2Ab07-X031098-31	98	104	103	98	127	106
2B10-4162	103	100	99	106	120	106
ABI Voyager	99	105	116	104	98	104
LCS Westminster	102	102	101	108	108	104
Moravian 169	114	107	88	97	105	102
Conrad	96	94	105	93	122	102
Moravian 69	113	101	99	---	89	100
2B10-4378	104	104	110	97	76	98
CDC Copeland	100	102	94	99	93	98
Moravian 150	113	107	95	107	64	97
ACC Synergy	94	98	102	93	96	97
ABI Balster	100	102	93	96	85	95
ABI Growler	88	100	99	93	91	94
Merem	90	108	94	101	77	94
Hockett	82	83	98	96	107	93
CDC Meredith	87	97	90	100	93	93
Harrington	92	83	94	95	100	93
AC Metcalfe	95	90	95	97	68	89
ND Genesis	86	77	89	96	90	88
Location Average (bu/A)	144	150	116	116	38	

Table 68. 2-Row Spring Feed Barley Yield Percentage of Location Averages, 2016.

	(100% =Average)				Variety Average
	Rupert	Aberdeen	Idaho Falls	Ashton	
Altorado	129	110	102	114	114
Oreana	114	111	104	123	113
Vespa	121	110	107	112	113
Xena	107	106	119	114	111
Baronesse	115	107	115	105	111
Harriman	113	115	109	103	110
Claymore	98	115	115	108	109
Lenetah	106	107	110	108	108
Kardia	103	106	115	102	107
Champion	111	94	103	114	106
Idagold II	110	111	99	100	105
RWA 1758	103	106	98	110	104
Julie*	84	96	95	88	91
Clearwater*	86	87	83	90	87
Sawtooth*	73	96	83	89	85
2Ab09-X06F058HL-31*	79	82	89	82	83
Transit*	74	75	79	70	75
CDC Fibar*	73	65	74	69	70
Location Average (bu/A)	141	142	114	121	

* indicates hullless variety

2016 Winter Grain Yield Percentage Across All Locations Charts

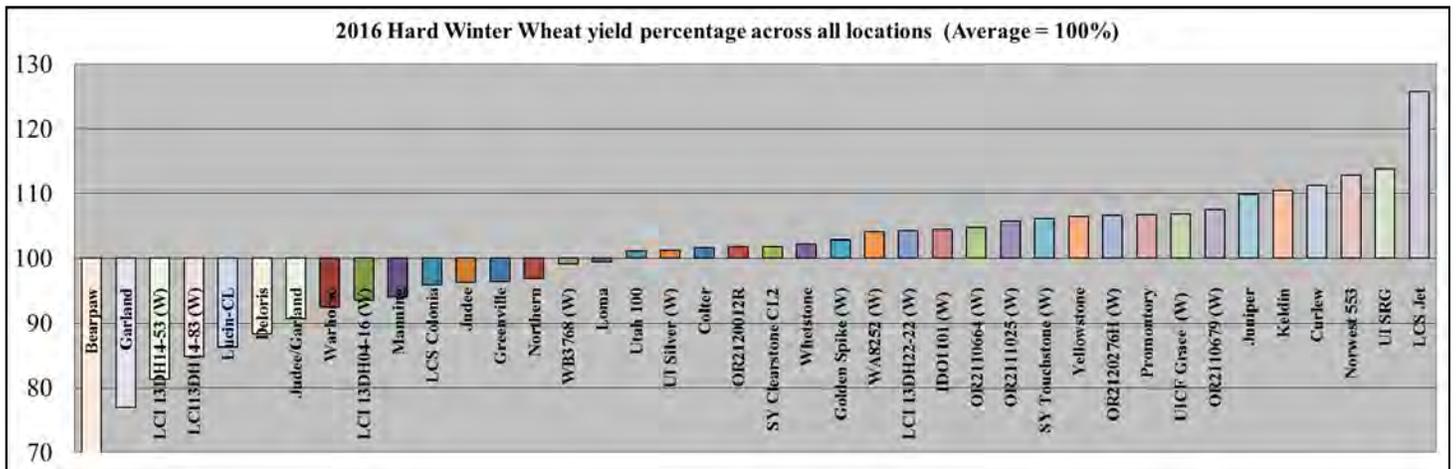


Chart 2. Hard Winter Wheat Yield Percentage Across All Locations.

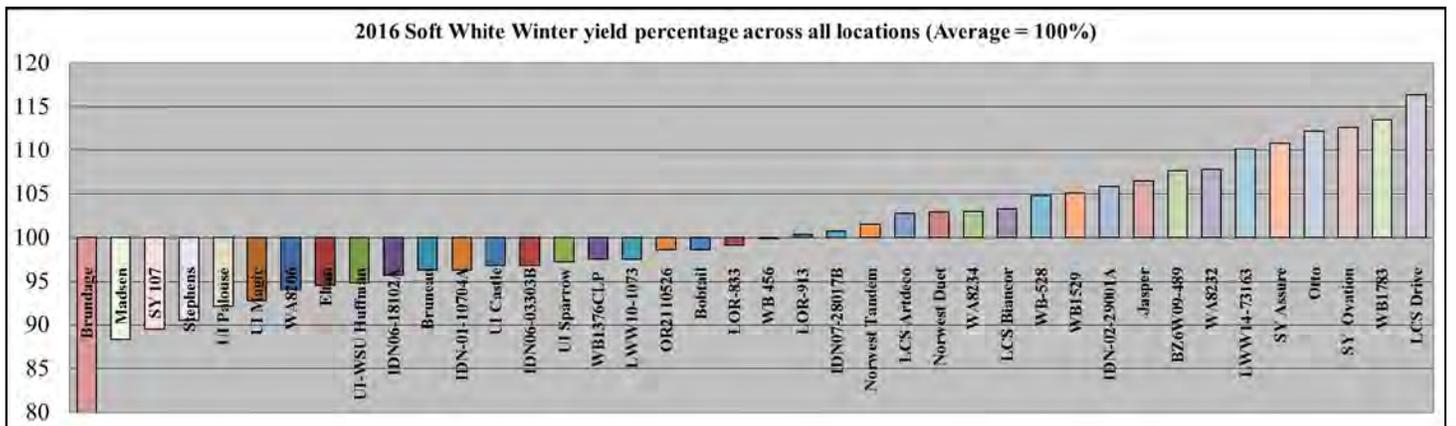


Chart 3. Soft White Winter Wheat Yield Percentage Across All Locations.

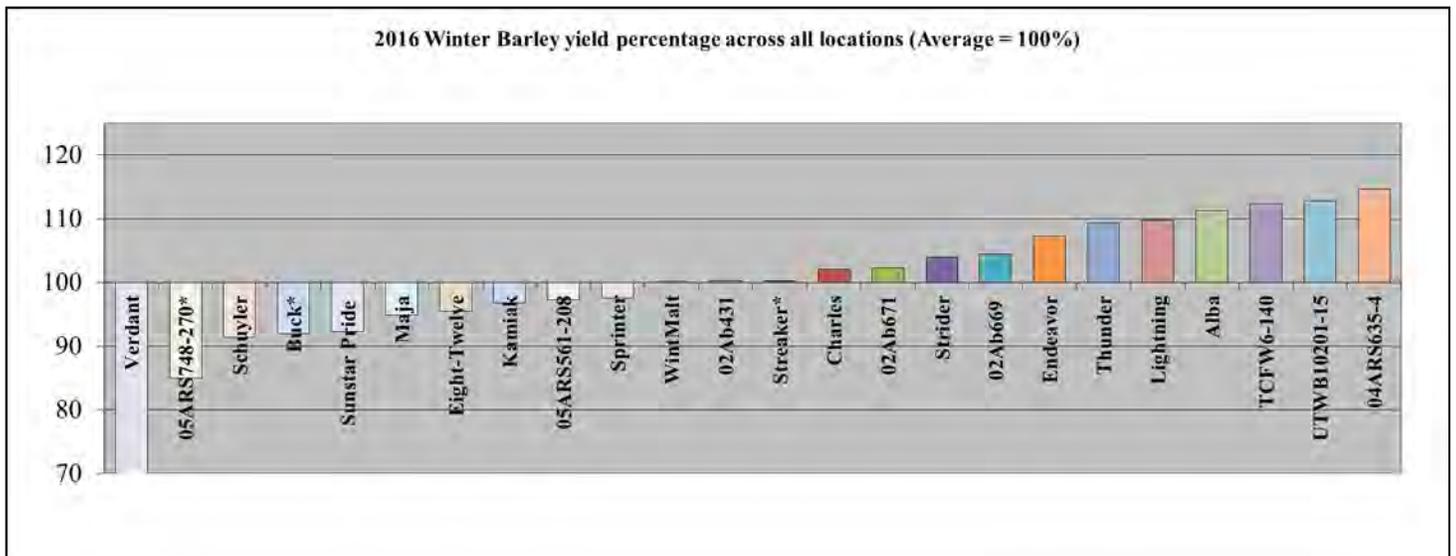


Chart 4. Winter Barley Yield Percentage Across All Locations. * indicates hullless variety.

2016 Spring Grain Yield Percentages Across All Locations Charts

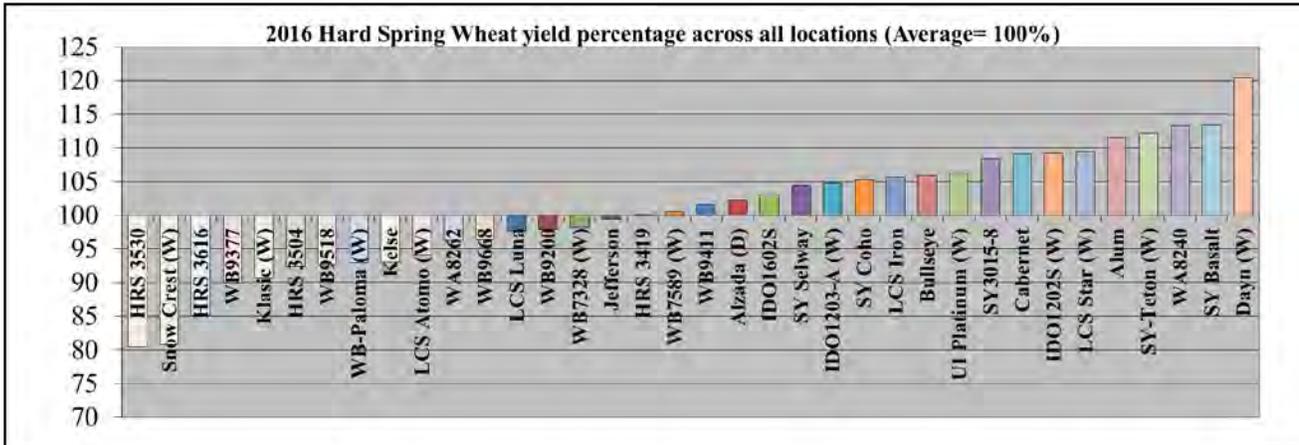


Chart 5. Hard Spring Wheat Yield Percentage Across All Locations.

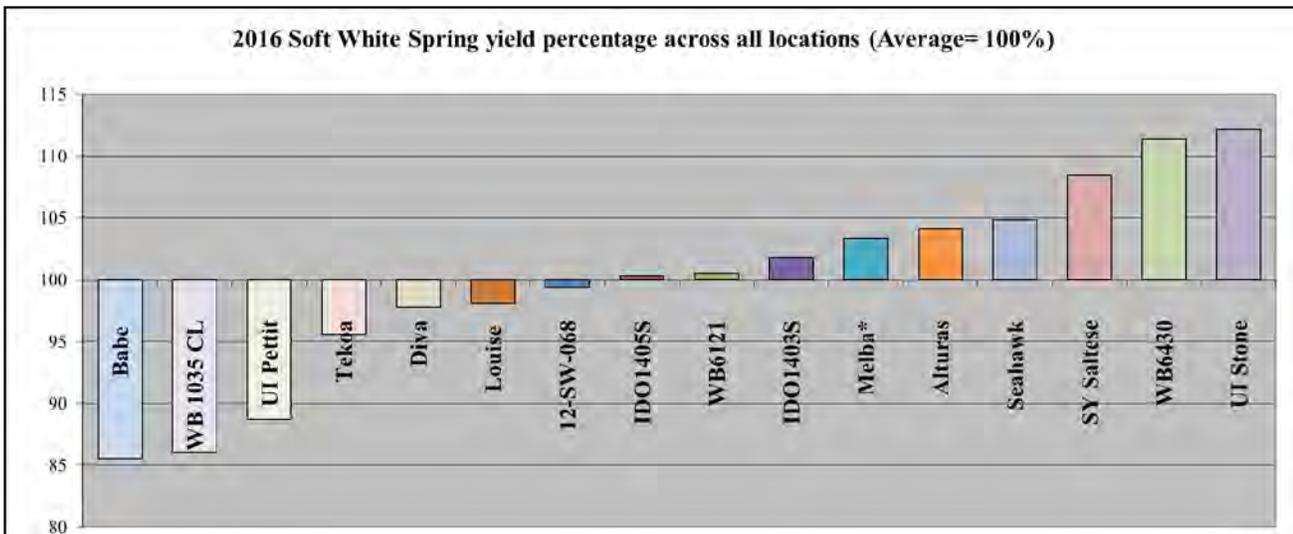


Chart 6. Soft White Spring Yield Percentage Across All Locations.

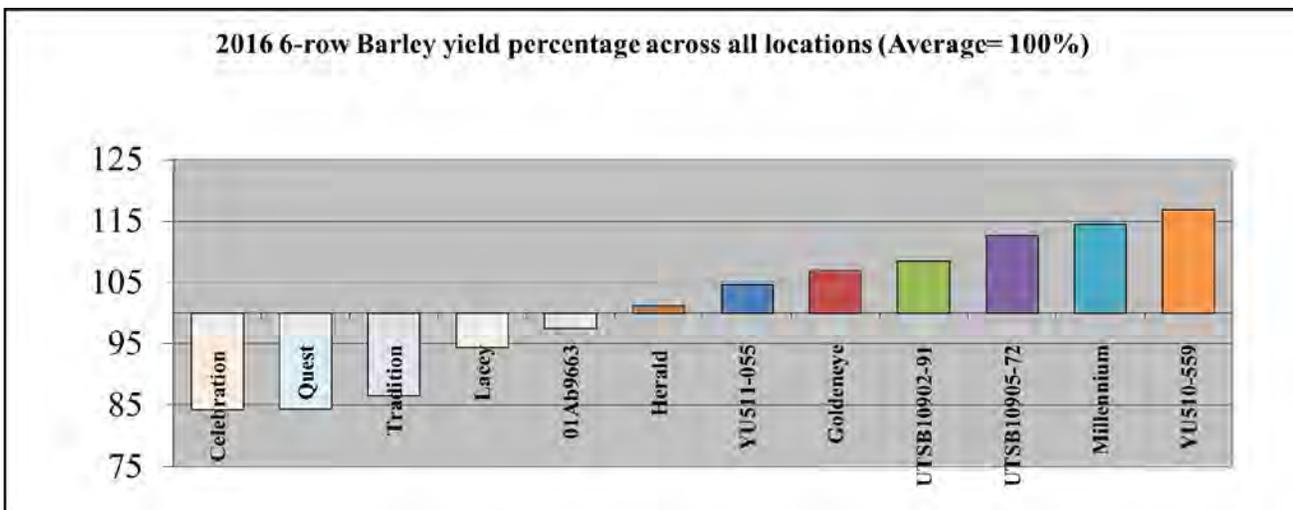


Chart 7. 6-Row Spring Barley Yield Percentage Across All Locations.

2016 2-Row Barley Yield Percentage Across All Locations Charts

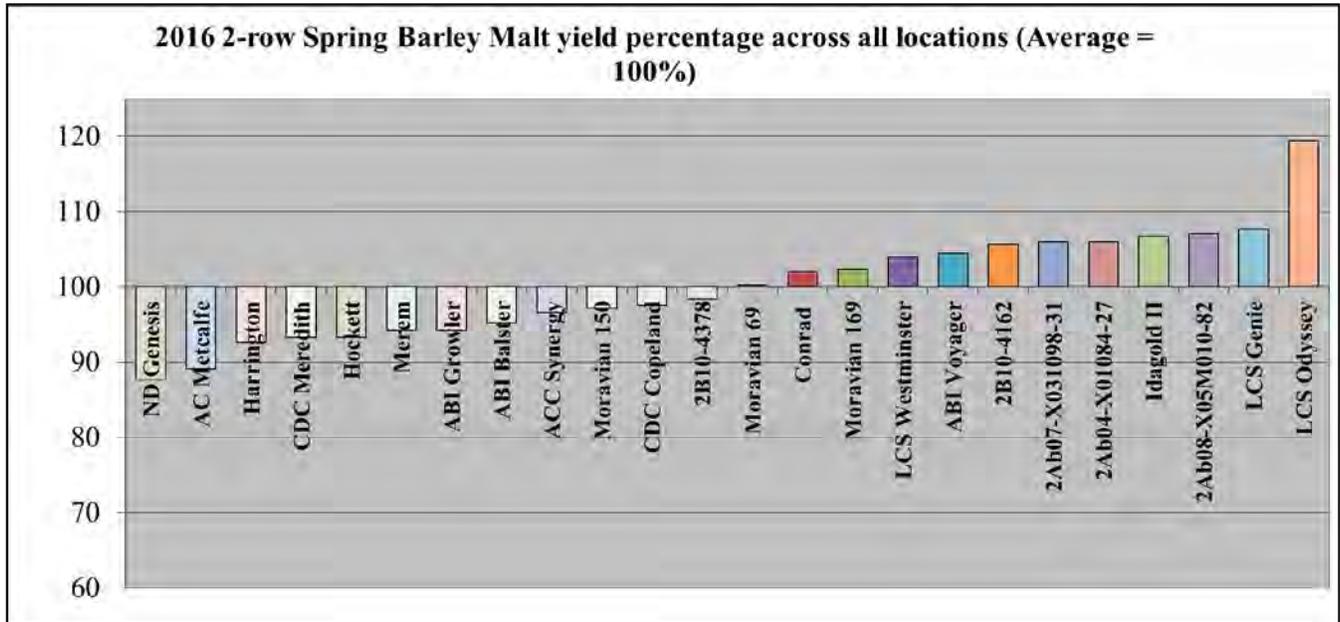


Chart 8. 2-Row Spring Malt Barley Yield Percentage Across All Locations.

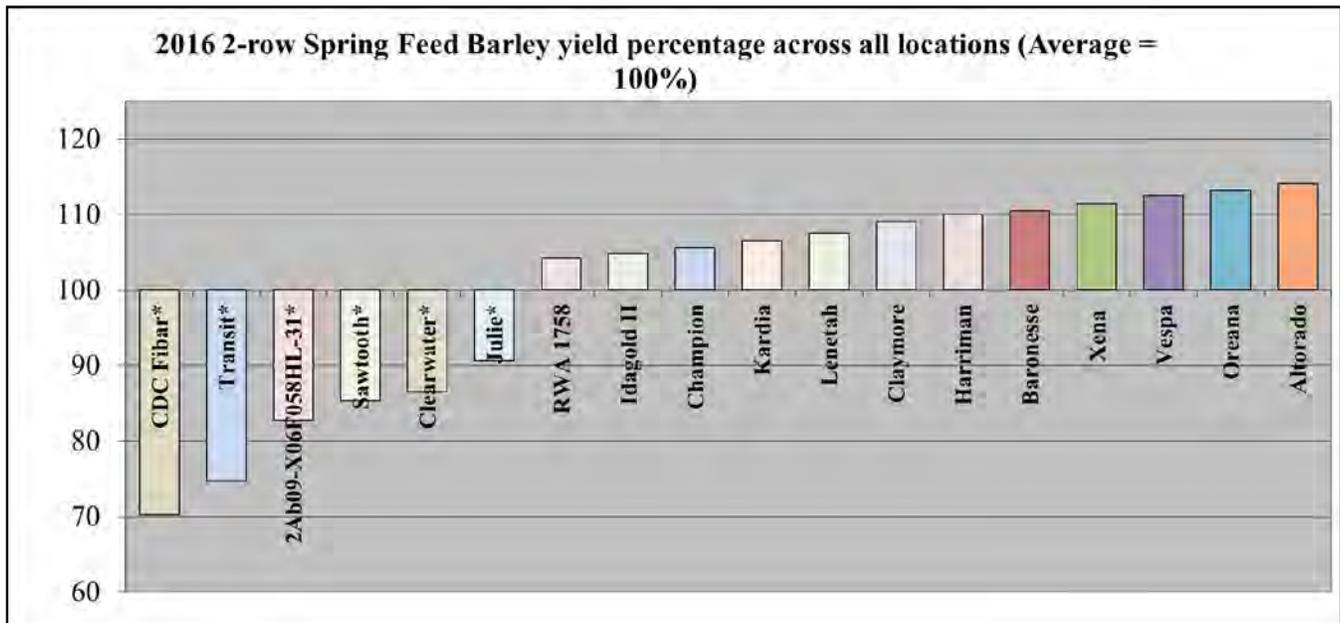


Chart 9. 2-Row Spring Feed Barley Yield Percentage Across All Locations. *indicates hullless variety.

Table 69. Hard Winter Wheat Grain Protein & Kernel Hardness, 2015.

Variety	-----Grain Protein %-----							-----Kernel Hardness 0-100-----						
	Kimberly	Aberdeen	Rupert	Ririe	Rockland	Soda Springs	Average	Kimberly	Aberdeen	Rupert	Ririe	Rockland	Soda Springs	Average
Colter	13.4	13.7	13.8	10.3	13.1	12.2	12.8	72	79	79	62.0	78.0	70.0	73.3
DAS001	12.8	12.3	12.8	10.4	11.9	---	12.0	77	76	75	64.0	75.0	---	73.4
Garland	13.3	12.8	13.8	10.6	11.8	12.7	12.5	69	76	75	61.0	73.0	59.0	68.8
Golden Spike (W)	13.1	11.7	13.0	9.6	10.8	11.4	11.6	79	71	68	52	71	64	67.5
Greenville	13.1	12.7	13.2	9.7	12.2	11.8	12.1	69	66	72	52	69	52	63.3
IDO1101 (W)	13.0	12.2	12.4	10.7	12.2	11.8	12.1	85	74	78	74.0	80.0	73.0	77.3
IDO1103	13.1	12.7	13.1	10.2	13.6	---	12.5	86	84	84	69	91	---	82.8
IDO1209DH (W)	12.8	13.7	13.4	10.4	13.1	---	12.7	83	86	84	66	83	---	80.4
Judee	13.6	13.1	13.6	11.1	14.1	11.8	12.9	78	74	74	62	78	68	72.3
Juniper	14.1	14.4	14.8	11.4	13.7	11.6	13.3	89	84	90	79	89	80	85.2
Juniper / Promontory	14.1	12.9	14.6	10.5	12.8	11.8	12.8	80	76	84	70	84	80	79.0
Keldin	12.6	11.7	12.3	---	---	---	12.2	77	67	68	---	---	---	70.7
LCS Azimut	12.9	12.0	13.0	9.0	11.7	---	11.7	77	72	71	52	72	---	68.8
LCS Colonia	13.3	11.5	12.5	9.0	10.9	11.4	11.4	59	56	60	44	52	56	54.5
Manning	13.4	12.5	12.8	9.9	12.1	11.9	12.1	79	76	73	55	72	71	71.0
Moreland	13.4	12.8	13.5	9.5	12.2	---	12.3	80	69	70	57.0	72.0	---	69.6
Northern	13.4	13.3	13.5	10.2	12.2	12.0	12.4	85	83	87	66	83	90	82.3
Norwest 553	13.0	11.6	12.9	10.3	11.6	---	11.9	72	67	69	56.0	66.0	---	66.0
LCS Jet	12.8	11.7	13.0	8.8	11.3	---	11.5	82	68	65	50	66	---	66.2
OR2100081H (W)	13.4	11.9	13.1	10.0	12.6	---	12.2	75	69	74	61	63	---	68.4
OR2110019H (W)	13.4	12.4	13.3	10.0	11.7	---	12.2	81	82	81	70	76	---	78.0
Promontory	12.7	11.8	12.4	9.7	12.1	11.7	11.7	78	72	75	58	76	70	71.5
SY Clearstone CL2	13.0	13.0	13.4	9.7	12.7	11.4	12.2	75	72	73	57.0	70.0	70.0	69.5
Utah 100	12.7	13.2	14.2	11.0	12.6	11.6	12.6	86	87	91	73	83	81	83.5
WA8184 (W)	13.4	12.9	13.3	10.1	12.3	---	12.4	82.0	74.0	77.0	65	74	---	74.4
WB-Arrowhead	12.8	12.3	12.7	10.7	13.0	11.9	12.2	78.0	69.0	74.0	58	75	65	69.8
WB-Arrowhead / Keldin	12.7	12.4	12.5	10.1	12.9	11.4	12.0	81.0	68.0	73.0	67	72	68	71.5
WB3768(W)	12.9	13.4	12.4	10.4	12.6	11.7	12.2	81.0	78.0	81.0	59	75	77	75.2
Whetstone	12.9	12.4	12.7	10.7	12.8	---	12.3	84.0	73.0	74.0	66	75	---	74.4
Yellowstone	12.8	12.9	13.3	10.0	13.6	11.5	12.4	78.0	74.0	84.0	61	81	75	75.5
Bearpaw	---	---	---	9.9	12.8	12.0	11.6	---	---	---	64.0	81	76	73.7
Curlew	---	---	---	9.8	12.4	11.7	11.3	---	---	---	59.0	78	66	67.7
Deloris	---	---	---	10.6	11.8	11.9	11.4	---	---	---	62	74	77	71.0
Eltan (SWW)	---	---	---	---	10.1	---	10.1	---	---	---	---	20	---	20.0
Juniper / Deloris	---	---	---	11.5	12.1	11.4	11.7	---	---	---	72	76	80	76.0
Lucin-CL	---	---	---	10.7	12.7	11.7	11.7	---	---	---	64	71	79	71.3
Otto (SWW)	---	---	---	---	9.9	---	9.9	---	---	---	---	21	---	21.0
UI Silver (W)	---	---	---	10.1	12.2	11.3	11.2	---	---	---	69.0	85	82	78.7
UISRG	---	---	---	10.7	12.1	12.1	11.6	---	---	---	78	85	81	81.3
UICF Grace (W)	---	---	---	10.0	12.4	13.1	11.8	---	---	---	74	76	91	80.3
Warhorse	---	---	---	10.6	13.6	13.1	12.4	---	---	---	71	81	78	76.7
Weston	---	---	---	10.9	12.2	13.0	12.0	---	---	---	64	70	69	67.7
Location Average	13.1	12.6	13.2	10.2	12.3	11.9	12.0	78.6	74.1	76.1	63.2	73.0	73.1	70.7

(W) = White

Table 70. Soft White Winter Wheat Grain Protein & Kernel Hardness, 2015.

Variety	-----Grain Protein %-----						-----Kernel Hardness 0-100-----					
	Kimberly	Aberdeen	Rupert	Ririe	Soda Springs	Average	Kimberly	Aberdeen	Rupert	Ririe	Soda Springs	Average
Bobtail	9.8	10.4	21.0	8.5	10.9	12.1	26	21	9.6	21	24	20.3
Brundage	10.2	10.5	27.0	7.9	---	13.9	28	22	11.5	14	---	18.9
Bruneau	9.5	10.8	21.0	8.0	10.6	12.0	20	17	9.8	9	26	16.4
DAS003	10.2	11.7	32.0	9.7	---	15.9	30	22	11.4	26	---	22.4
DAS004	10.3	11.9	33.0	9.1	---	16.1	28	31	11.3	25	---	23.8
Eltan	10.5	12.8	28.0	9.5	10.9	14.3	22	24	11.7	20	23	20.1
UI Castle	10.0	12.9	29.0	10.3	---	15.6	24	17	12.3	22	---	18.8
UI Magic	10.1	11.6	29.0	9.4	---	15.0	28	24	10.9	22	---	21.2
UI Palouse	10.4	11.7	28.0	9.2	---	14.8	20	20	11.7	17	---	17.2
IDN-01-10704A	9.2	10.9	31.0	9.3	---	15.1	26	25	11.1	29	---	22.8
IDN-02-29001A	9.8	11.6	22.0	8.7	---	13.0	20	21	10.8	17	---	17.2
IDO1004	9.3	10.8	13.0	8.7	---	10.5	18	17	9.9	14	---	14.7
IDO1005	10.0	11.7	27.0	9.2	---	14.5	24	23	9.9	20	---	19.2
UI Sparrow	9.6	10.9	31.0	7.7	10.7	14.0	23	23	10.4	12	32	20.1
Kaseberg	9.3	10.8	22.0	8.1	11.1	12.3	16	17	10.7	19	22	16.9
LCS Artdeco	9.5	9.9	11.0	---	---	10.1	18	10	9.8	---	---	12.6
LCS Biancor	9.2	10.6	19.0	---	---	12.9	24	20	9.5	---	---	17.8
Norwest Duet	10.3	11.2	33.0	9	---	15.9	29	25	11.7	25	---	22.7
Norwest Tandem	10.3	10.7	26.0	8.1	---	13.8	25	22	10.4	14	---	17.9
LOR-833	10.2	11.0	25.0	8.7	---	13.7	22	19	10.9	8	---	15.0
LOR-913	10.1	11.5	25.0	10	---	14.2	24	22	11.1	22	---	19.8
LOR-978	11.4	12.2	30.0	9.8	---	15.9	29	24	11.3	28	---	23.1
LCS Drive	9.0	11.2	24.0	---	---	14.7	26	19	10.2	---	---	18.4
Madsen	10.6	11.3	26.0	9.1	11	13.6	24	21	11.1	20	28	20.8
Mary	10.6	11.0	28.0	8.4	---	14.5	24	18	11	8	---	15.3
OR2080637	9.7	11.4	28.0	10	---	14.8	23	23	12.4	29	---	21.9
OR2080641	9.8	11.1	26.0	8.7	---	13.9	26	24	9.9	20	---	20.0
OR2090473	9.3	10.4	20.0	8.2	---	12.0	23	16	11.2	8	---	14.6
OR2100940	10.2	10.2	25.0	8.4	---	13.5	22	11	11	15	---	14.8
Rosalyn	9.4	9.9	29	8	11	13.5	21	15	10.7	16	28	18.1
Stephens	10.1	10.8	26	9.2	11.9	13.6	25	20	11.5	13	28	19.5
SY Ovation	9.8	10.9	19	---	11.1	12.7	24	20	8.9	---	28	20.2
SY 107	9.4	11.1	29	---	---	16.5	29	24	10.7	---	---	21.2
SY Assure	10.1	11.8	20	---	---	14.0	23	24	10.2	---	---	19.1
UI-WSU Huffman	9.6	11	23	8.5	---	13.0	21	19	10.7	14	---	16.2
Jasper	10.2	11.5	17	9.6	10.3	11.7	20	17	10.5	25	24	19.3
WB 456	10.2	12.6	30	9.2	11	14.6	31	30	10.3	19	30	24.1
WB 528	10.1	11.3	22	---	---	14.5	27	27	9.7	---	---	21.2
WB1376CLP	10.3	12.9	22	9.9	11.8	13.4	30	27	11.3	20	27	23.1
WB1529	10	11.9	23	---	---	15.0	30	23	9.9	---	---	21.0
Madsen / Eltan (50/50)	10	11.8	28	9.9	11.1	14.2	22	20	11.1	22	25	20.0
06-03303B	10.1	10.7	24.0	---	---	14.9	16	16	11	---	---	14.3
LWW10-1073	---	---	---	10.2	---	10.2	---	---	---	23	---	23.0
UICF Brundage	---	---	---	9	10.6	9.8	---	---	---	16	18	17.0
Otto	---	---	---	9.8	12.1	11.0	---	---	---	25	28	26.5
Location Average	9.9	11.3	25.0	9.0	11.1	13.7	24.1	21.0	10.7	18.8	26.1	19.3

Table 71. Hard Spring Wheat Grain Protein & Kernel Hardness, 2015.

Variety	-----Grain Protein %-----						-----Kernel Hardness 0-100-----					
	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average
Hard Red Spring												
LCS Luna	14.1	13.3	14.1	13.8	13.6	13.8	75	80	74	84	81.0	78.8
LCS Iron	14.2	13.4	14.6	13.5	13.3	13.8	79	83	80	86	88.0	83.2
Alum	---	---	---	12.9	---	12.9	---	---	---	79	---	79.0
Bullseye	14.1	13.2	14.5	14.8	---	14.2	75	83	80	100	---	84.5
Cabernet	14.0	13.9	14.2	14.9	---	14.3	62	70	71	86	---	72.3
HRS3419	13.5	12.5	13.2	13.1	---	13.1	77	82	79	85	---	80.8
HRS3504	14.5	13.2	14.8	14.0	---	14.1	89	98	95	100	---	95.5
HRS3530	15.3	14.4	15.3	14.6	---	14.9	79	89	90	94	---	88.0
IDO862E	14.4	15.0	14.7	15.0	14.0	14.6	79	83	78	89	79	81.6
Jefferson	14.3	13.7	14.4	14.4	12.6	13.9	76	82	81	82	81	80.4
Kelse	14.8	14.7	15.6	15.2	13.7	14.8	73	74	79	85	77.0	77.6
SY Basalt	13.8	13.0	14.3	13.8	---	13.7	70	79	82	82	---	78.3
SY Coho	14.0	13.1	14.6	13.1	---	13.7	73	78	87	80	---	79.5
SY Selway	---	---	---	---	13.6	13.6	---	---	---	---	98.0	98.0
UI Winchester	14.6	13.7	14.6	14.2	12.7	14.0	70	77	72	78	72.0	73.8
WB9229	15.0	14.2	15.3	14.9	---	14.9	78	81	87	94	---	85.0
WB9411	14.3	13.8	14.6	15.4	13.7	14.4	71	80.0	84.0	92.0	84.0	82.2
WB9668	15.0	15.2	15.3	16.0	14.4	15.2	75	83	87	93	90.0	85.6
Alzada (D)	14.9	16.2	15.2	17.1	---	15.9	100	---	---	---	---	100.0
LCS Kiko (D)	13.9	15.4	14.9	16.2	---	15.1	99	---	---	---	---	99.0
Hard White Spring												
Dayn (W)	14.4	13.6	14.6	14.2	13.0	14.0	83	83	95	99	91	90.2
IDO1202S (W)	14.4	13.4	14.2	14.1	11.7	13.6	76	85	77	84	81	80.6
IDO1203 (W)	14.6	14.0	14.5	14.5	12.2	14.0	83	87	84	89	83	85.2
UI Platinum (W)	13.8	13.1	14.0	14.1	12.8	13.6	58	68	71	78	75	70.0
Klasic (W)	13.6	14.0	14.1	14.5	12.0	13.6	54	84	63	75	63	67.8
LCS Atomo (W)	14.1	13.1	14.7	13.9	12.1	13.6	84	68	91	98	95	87.2
LCS Star (W)	13.7	13.7	14.3	13.2	12.9	13.6	74	60	85	87	92	79.6
Snow Crest (W)	14.3	12.8	14.9	14.8	---	14.2	52	63	64	69	---	62.0
SY Teton (W)	13.6	12.6	14.0	12.6	11.4	12.8	57	62	70	69	71	65.8
WB-Paloma (W)	14.6	13.7	14.6	14.8	---	14.4	73	75	79	84	---	77.8
WB7328 (W)	14.6	14.7	15.3	14.6	---	14.8	59	65	74.0	75.0	---	68.3
WB7589 (W)	14.6	14.3	14.9	14.6	---	14.6	68	77	79	87	---	77.8
Location Average	14.3	13.8	14.6	14.4	12.9	14.1	74.0	77.8	79.9	85.6	82.4	81.1

(W) = White
(D) = Durum

Table 72. Soft White Spring Wheat Grain Protein & Kernel Hardness, 2015.

Variety	-----Grain Protein %-----						-----Kernel Hardness 0-100-----					
	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average
Alpowa	9.7	10.8	10.2	10.4	10.9	10.4	23	22	26	26	27	24.8
Alturas	10.3	10.9	10.4	9.9	11.1	10.5	21	21	26	21	32	24.2
Babe	9.6	10.7	10.2	10.4	10.3	10.2	20	23	23	27	25	23.6
IDO 851	10.1	10.9	10.6	9.8	10.9	10.5	22	24	27	28	33	26.8
M12001	11.1	11.9	10.7	10.4	11.5	11.1	19	26	23	19	28	23.0
Diva	10.4	11.4	11.2	9.8	11.5	10.9	28	29	28	35	31	30.2
UI Pettit	10.0	10.0	9.6	10.7	10.4	10.1	25	27	25	32	30	27.8
UI Stone	9.8	9.9	9.8	10.0	10.4	10.0	16	17	20	20	29	20.4
Seahawk	9.7	10.9	9.7	10.4	11.1	10.4	30	35	31	34	30	32.0
Tekoa	9.7	10.6	10.0	10.3	11.0	10.3	24	28	28	28	34	28.4
WA 8214	11.0	11.2	10.9	10.9	10.4	10.9	20	25	25	25	29	24.8
WB6430	9.6	10.6	9.8	10.4	10.4	10.2	22	24	25	26	30	25.4
Location Average	10.1	10.8	10.3	10.3	10.8	10.5	22.5	25.1	25.6	26.8	29.8	26.0

Table 73. Percent flour protein and flour yield for soft white winter wheat at Kimberly, Ririe, and Aberdeen, 2015.

Variety	Flour Protein (%)						Flour Yield (%)					
	Kimberly	Aberdeen	Rupert	Ririe	Soda Springs	Average	Kimberly	Aberdeen	Rupert	Ririe	Soda Springs	Average
Bobtail	9.2	9.3	8.0	6.2	9.6	8.5	68.4	69.5	69.3	68.5	65.2	68.2
Brundage	9.4	9.6	9.1	6.1	---	8.6	65.9	66.9	61.6	66.8	---	65.3
Bruneau	9.1	10.0	7.5	6.8	9.1	8.5	66.5	66.9	64.3	66.0	63.8	65.5
DAS003	9.5	10.9	9.8	8.2	---	9.6	67.0	68.7	62.7	67.5	---	66.5
DAS004	9.6	11.1	9.2	7.5	---	9.4	65.7	67.2	64.9	69.3	---	66.8
Eltan	9.8	11.8	9.4	7.9	9.7	9.7	63.5	63.5	61.8	66.3	60.5	63.1
UI Castle	9.2	11.9	10.0	8.5	---	9.9	69.4	66.2	62.0	70.6	---	67.0
UI Magic	8.8	10.3	8.6	7.5	---	8.8	65.3	66.0	61.7	66.8	---	64.9
UI Palouse	9.8	10.7	9.1	8.1	---	9.4	63.8	63.8	62.6	67.7	---	64.5
IDN-01-10704A	8.4	9.8	8.4	7.4	---	8.5	66.6	67.7	66.4	67.1	---	67.0
IDN-02-29001A	9.2	10.7	8.7	7.3	---	9.0	66.2	67.1	65.0	69.9	---	67.0
IDO1004	8.5	10.1	8.0	7.4	---	8.5	69.3	67.4	67.1	69.0	---	68.2
IDO1005	8.9	10.7	8.3	7.9	---	9.0	68.9	66.6	67.3	68.3	---	67.8
UI Sparrow	8.6	10.1	8.7	6.7	9.8	8.8	66.3	64.0	63.1	66.1	61.6	64.2
Kaseberg	8.5	9.7	9.0	6.6	9.8	8.7	66.8	64.9	63.4	66.0	61.7	64.6
LCS Artdeco	8.9	9.4	9.1	---	---	9.1	65.7	63.9	63.6	---	---	64.4
LCS Biancor	8.1	9.3	7.5	---	---	8.3	64.6	63.5	65.8	---	---	64.6
Norwest Duet	9.3	10.2	9.7	7.6	---	9.2	66.8	66.1	64.0	67.9	---	66.2
Norwest Tandem	9.3	9.7	8.2	7.6	---	8.7	64.7	64.2	64.6	64.5	---	64.5
LOR-833	9.7	10.4	8.9	7.9	---	9.2	65.2	65.9	65.7	66.1	---	65.7
LOR-913	9.5	10.0	8.4	8.4	---	9.1	65.7	67.3	65.9	64.4	---	65.8
LOR-978	10.2	10.6	9.1	7.9	---	9.5	61.8	64.0	63.4	62.7	---	63.0
LCS Drive	7.9	9.7	7.6	---	---	8.4	63.6	63.5	63.1	---	---	63.4
Madsen	9.6	10.1	9.1	7.4	10.6	9.4	65.4	67.5	67.0	66.4	63.9	66.0
Mary	9.7	10.0	8.7	7.3	---	8.9	67.9	68.6	67.8	70.2	---	68.6
OR2080637	8.7	9.8	9.9	7.9	---	9.1	68.1	68.1	63.4	66.3	---	66.5
OR2080641	8.7	9.7	8.1	7.1	---	8.4	66.3	66.9	67.3	66.9	---	66.8
OR2090473	8.6	8.8	9.1	7.2	---	8.4	65.9	66.7	63.3	66.3	---	65.5
OR2100940	9.4	8.8	8.5	6.8	---	8.4	65.0	67.0	66.0	66.3	---	66.1
Rosalyn	8.5	8.7	8.2	6.4	10.1	8.4	65.8	66.4	65.7	66.5	61.5	65.2
Stephens	9.1	9.5	9.1	8.0	11.1	9.4	65.3	65.2	64.4	66.0	60.2	64.2
SY Ovation	8.8	9.4	7.6	---	10.0	9.0	65.4	66.1	65.9	---	63.2	65.1
SY 107	8.5	9.5	8.6	---	---	8.9	62.4	62.9	60.1	---	---	61.8
SY Assure	9.2	10.4	8.3	---	---	9.3	64.4	64.8	66.0	---	---	65.0
UI-WSU Huffman	8.6	9.8	9.0	7.5	---	8.7	66.5	67.1	65.4	66.4	---	66.3
Jasper	9.3	10.6	9.0	7.6	9.7	9.2	66.7	67.6	66.4	68.3	65.0	66.8
WB 456	9.1	11.3	8.5	8.0	10.4	9.5	66.0	65.1	66.8	65.5	64.1	65.5
WB 528	9.5	10.1	8.3	---	---	9.3	65.7	65.7	67.1	---	---	66.2
WB1376CLP	9.3	11.5	9.6	8.8	11.2	10.1	64.0	62.8	61.1	63.6	62.4	62.8
WB1529	9.1	10.4	7.9	---	---	9.1	62.6	61.6	63.1	---	---	62.4
Madsen / Eltan (50/50)	9.4	10.1	8.4	8.6	10.7	9.4	66.0	66.3	65.9	67.0	61.3	65.3
06-03303B	9.5	9.3	8.6	---	---	9.1	66.3	66.7	63.8	---	---	65.6
LWW10-1073	---	---	---	9.1	---	9.1	---	---	---	65.0	---	65.0
UICF Brundage	---	---	---	7.9	10.3	9.1	---	---	---	67.7	61.8	64.8
Otto	---	---	---	8.3	11.5	9.9	---	---	---	64.8	60.1	62.4
Location average	9.1	10.1	8.7	7.6	10.2	9.0	65.8	65.9	64.7	66.8	62.4	65.4

Table 74. Percent break flour yield and cookie diameter for soft white winter wheat at Kimberly, Ririe, and Aberdeen, 2015.

Variety	Break Flour Yield (%)						Cookie Diameter (cm)					
	Kimberly	Aberdeen	Rupert	Ririe	Soda Springs	Average	Kimberly	Aberdeen	Rupert	Ririe	Soda Springs	Average
Bobtail	45.3	44.5	46.4	49.7	38.8	44.9	8.9	8.8	8.9	8.5	8.5	8.7
Brundage	42.1	42.5	41.4	48.9	---	43.7	9.0	9.0	9.0	9.0	---	9.0
Bruneau	42.9	42.7	43.4	46.9	36.5	42.5	9.1	8.8	9.2	9.2	8.5	9.0
DAS003	39.6	40.4	37.4	42.0	---	39.8	8.7	8.4	8.7	9.2	---	8.7
DAS004	41.1	41.3	39.7	45.5	---	41.9	8.9	8.6	8.8	8.8	---	8.8
Eltan	43.0	41.6	42.3	46.9	37.9	42.3	9.0	8.7	8.7	9.0	8.3	8.7
UI Castle	42.9	43.5	40.4	46.1	---	43.2	9.0	8.5	8.8	9.1	---	8.9
UI Magic	41.2	39.6	39.5	45.2	---	41.4	9.0	8.7	8.9	9.1	---	8.9
UI Palouse	41.6	41.1	43.1	47.0	---	43.2	8.9	8.6	8.9	9.0	---	8.9
IDN-01-10704A	44.5	44.0	45.8	47.1	---	45.4	9.3	8.9	9.1	9.0	---	9.1
IDN-02-29001A	43.4	43.6	42.5	50.1	---	44.9	8.9	8.7	9.0	9.1	---	8.9
IDO1004	47.0	44.6	45.7	51.2	---	47.1	8.9	8.9	8.9	9.2	---	9.0
IDO1005	44.1	41.5	42.7	46.6	---	43.7	8.8	8.8	8.9	8.8	---	8.8
UI Sparrow	42.1	39.6	38.9	44.7	34.7	40.0	8.9	8.8	8.8	9.0	8.4	8.8
Kaseberg	48.7	44.7	47.1	50.1	39.6	46.0	9.1	8.8	9.0	9.2	8.7	8.9
LCS Artdeco	42.6	42.2	43.8	---	---	42.9	8.6	8.8	8.5	---	---	8.6
LCS Biancor	44.1	43.3	45.7	---	---	44.4	8.9	8.6	8.9	---	---	8.8
Norwest Duet	41.1	42.1	41.4	44.8	---	42.3	8.7	8.8	8.8	8.9	---	8.8
Norwest Tandem	39.6	39.5	40.3	44.6	---	41.0	8.9	8.6	8.9	9.1	---	8.9
LOR-833	40.6	38.9	42.3	45.3	---	41.8	8.9	8.8	8.8	9.1	---	8.9
LOR-913	42.9	44.0	45.4	45.6	---	44.5	8.8	8.8	8.7	9.0	---	8.9
LOR-978	38.6	40.8	40.5	43.6	---	40.9	8.9	8.7	8.7	9.1	---	8.9
LCS Drive	40.8	41.7	43.5	---	---	42.0	9.0	8.9	8.9	---	---	8.9
Madsen	41.0	41.3	39.6	44.6	35.3	40.4	8.8	8.8	8.6	8.9	8.2	8.7
Mary	40.6	42.5	42.7	49.2	---	43.8	8.7	8.7	8.7	9.2	---	8.8
OR2080637	51.0	50.1	47.1	50.6	---	49.7	9.1	8.6	9.0	9.2	---	9.0
OR2080641	37.7	39.3	39.7	45.0	---	40.4	8.8	8.8	8.7	9.0	---	8.8
OR2090473	41.8	43.8	42.1	49.3	---	44.3	8.7	8.6	8.8	8.7	---	8.7
OR2100940	42.2	44.6	43.2	50.3	---	45.1	9.1	8.7	9.0	9.1	---	8.9
Rosalyn	40.2	40.8	40.5	48.6	35.3	41.1	8.8	8.8	8.7	9.1	8.2	8.7
Stephens	36.8	37.6	37.1	43.6	32.2	37.5	8.8	8.6	8.8	8.8	8.3	8.7
SY Ovation	39.4	39.1	39.8	---	35.5	38.5	8.7	8.8	8.7	---	8.4	8.6
SY 107	37.3	38.8	38.4	---	---	38.1	8.7	8.7	8.7	---	---	8.7
SY Assure	40.6	38.6	43.4	---	---	40.8	8.9	8.6	8.8	---	---	8.8
UI-WSU Huffman	40.9	41.0	40.8	43.9	---	41.6	8.7	9.0	8.9	8.9	---	8.9
Jasper	44.0	44.1	45.0	48.8	40.9	44.6	8.9	8.8	9.0	9.2	8.5	8.9
WB 456	37.2	36.4	38.8	42.1	36.2	38.1	8.7	8.8	8.5	8.9	8.4	8.7
WB 528	38.5	37.4	40.6	---	---	38.8	8.8	8.4	8.8	---	---	8.7
WB1376CLP	38.0	35.7	38.6	40.8	35.1	37.6	9.0	8.8	8.7	9.0	8.4	8.8
WB1529	39.3	38.4	41.6	---	---	39.8	8.8	8.9	8.6	---	---	8.8
Madsen / Eltan (50/50)	43.1	40.4	42.5	46.5	37.3	42.0	8.4	8.9	8.7	8.7	8.3	8.6
06-03303B	44.8	45.3	43.5	---	---	44.6	8.8	8.7	8.8	---	---	8.8
LWW10-1073	---	---	---	42.9	---	42.9	---	---	---	8.9	---	8.9
UICF Brundage	---	---	---	50.8	40.2	45.5	---	---	---	9.2	8.6	8.9
Otto	---	---	---	46.0	36.6	41.3	---	---	---	9.0	8.2	8.6
Location average	41.8	41.5	42.0	46.5	36.8	42.4	8.9	8.7	8.8	9.0	8.4	8.8

Table 75. Percent flour protein and flour yield for soft white spring wheat at Rupert, Aberdeen, Idaho Falls, Ashton, and Soda Springs, 2015.

Variety	Flour Protein (14% mb)						Flour Yield (%)					
	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average
Alpowa	9.0	9.3	9.7	9.0	8.9	9.2	60.5	53.9	63.5	60.8	54.3	58.6
Alturas	9.9	9.2	9.8	8.7	9.4	9.4	64.9	59.3	65.1	64.6	60.2	62.8
Babe	9.2	9.4	9.6	8.9	8.9	9.2	63.3	64.9	65.0	61.0	58.5	62.6
IDO 851	9.5	9.4	9.8	8.7	9.2	9.3	65.2	67.7	65.7	65.0	61.0	64.9
M12001	10.6	10.7	10.1	9.2	9.8	10.1	63.0	65.9	64.2	62.7	58.2	62.8
Diva	9.6	10.3	10.0	7.9	9.5	9.5	65.8	67.2	66.0	65.1	63.6	65.5
UI Pettit	9.3	9.3	9.0	9.0	9.1	9.1	64.8	68.7	66.6	65.7	63.9	65.9
UI Stone	9.3	9.0	9.2	8.5	8.9	9.0	66.2	69.3	68.0	66.7	63.6	66.8
Seahawk	8.5	9.4	8.9	8.8	9.3	9.0	66.7	66.1	65.9	64.1	57.8	64.1
Tekoa	9.0	9.4	9.2	8.5	8.6	8.9	68.6	67.5	67.2	66.2	60.7	66.1
WA 8214	10.0	10.3	9.9	9.2	9.2	9.7	65.9	66.8	65.0	64.3	61.5	64.7
WB6430	9.2	9.8	9.0	8.9	9.0	9.2	67.1	67.6	67.1	65.8	61.2	65.8
Location Average	9.4	9.6	9.5	8.8	9.2	9.3	65.2	65.4	65.8	64.3	60.4	64.2

mb=moisture basis

Table 76. Percent break flour and cookie diameter for soft white spring wheat at Rupert, Aberdeen, Idaho Falls, Ashton, and Soda Springs, 2015.

Variety	Break Flour (%)						Cookie Diameter (cm)					
	Rupert	Aberdeen	Idaho	Ashton	Soda	Average	Rupert	Aberdeen	Idaho	Ashton	Soda	Average
			Falls	Falls	Springs				Falls	Springs		
Alpowa	38.7	35.1	38.3	35.0	34.7	36.4	8.6	8.8	8.6	8.6	8.5	8.6
Alturas	39.2	37.4	38.6	34.8	33.1	36.6	8.8	9.1	8.6	8.5	8.7	8.7
Babe	39.7	41.0	38.5	33.4	35.3	37.6	8.7	9.0	8.8	8.5	8.6	8.7
IDO 851	40.5	41.6	38.3	35.1	33.5	37.8	8.6	8.9	8.9	8.5	8.5	8.7
M12001	39.3	40.7	37.0	34.0	31.7	36.5	8.6	8.6	8.7	8.8	8.6	8.7
Diva	40.5	41.2	41.5	37.1	36.5	39.4	8.8	8.7	9.0	9.1	8.5	8.8
UI Pettit	40.9	42.5	41.2	37.3	35.3	39.4	8.8	8.9	9.0	8.8	9.0	8.9
UI Stone	42.8	44.7	42.8	40.3	38.0	41.7	8.8	9.0	8.9	8.8	8.9	8.9
Seahawk	41.0	38.8	38.6	35.9	33.9	37.6	8.6	8.6	8.7	8.6	8.5	8.6
Tekoa	43.3	42.0	41.0	37.8	36.3	40.1	8.8	8.8	8.7	8.7	8.9	8.8
WA 8214	41.7	40.7	38.6	35.1	34.2	38.0	8.6	8.6	8.7	8.4	8.4	8.5
WB6430	43.4	41.8	42.3	38.6	35.0	40.2	8.8	8.8	9.1	8.5	8.8	8.8
Location Average	40.9	40.6	39.7	36.2	34.8	38.4	8.7	8.8	8.8	8.7	8.7	8.7

Table 77. Percent flour protein and flour yield for hard winter wheat at Aberdeen, Kimberly, Ririe, Rockland, and Soda Springs, 2015.

Variety	Flour Protein (14% mb)							Flour Yield (%)						
	Kimberly	Aberdeen	Rupert	Ririe	Rockland	Soda Spring	Average	Kimberly	Aberdeen	Rupert	Ririe	Rockland	Soda Spring	Average
Hard Red Winter Wheat														
Colter	11.8	13.4	12.2	8.6	11.0	11.5	11.4	60.6	59.0	57.0	61.1	59.0	58.5	59.2
DAS001	10.8	11.9	11.5	8.5	10.6	---	10.7	61.3	62.5	61.2	62.8	61.5	---	61.8
Garland	11.6	12.3	11.3	8.4	10.2	12.1	11.0	57.0	59.2	53.6	60.9	56.7	54.9	57.1
Greenville	10.6	11.5	11.1	7.7	10.5	10.8	10.4	53.9	59.9	51.7	59.8	56.3	50.8	55.4
IDO1103	11.3	12.3	11.7	7.3	12.2	---	11.0	63.8	66.5	59.0	64.5	60.5	---	62.9
Judee	11.8	12.6	12.3	8.6	12.8	10.9	11.5	59.3	62.7	58.4	63.9	60.9	58.4	60.6
Juniper	13.0	14.0	13.5	8.8	12.7	10.9	12.2	60.6	61.4	57.9	60.6	58.3	60.1	59.8
Juniper / Promontory	12.6	12.2	13.5	8.4	11.5	11.5	11.6	60.4	63.5	57.5	62.1	59.5	59.9	60.5
Keldin	10.9	11.0	10.7	---	---	---	10.9	61.5	63.2	61.1	---	---	---	61.9
LCS Azimut	10.9	11.2	10.9	6.6	10.5	---	10.0	60.9	63.2	58.3	64.6	60.8	---	61.6
LCS Colonia	11.1	11.1	11.3	7.4	9.5	11.2	10.3	63.5	64.6	61.8	65.9	63.6	61.3	63.4
Manning	10.4	11.5	11.5	8.0	10.7	11.1	10.5	60.3	63.4	58.2	63.7	60.4	59.3	60.9
Moreland	11.1	12.0	11.6	7.2	10.8	---	10.5	59.8	63.1	57.0	62.0	60.4	---	60.5
Northern	11.6	13.1	12.6	7.8	11.0	11.8	11.3	57.3	61.1	54.2	61.6	56.3	56.9	57.9
Norwest 553	10.9	10.9	11.4	7.9	9.9	---	10.2	61.9	63.7	58.4	62.2	61.7	---	61.6
LCS Jet	10.4	10.6	11.3	6.8	9.3	---	9.7	60.7	64.3	59.6	61.7	60.5	---	61.4
Promontory	11.2	10.8	11.0	7.3	10.4	11.1	10.3	60.9	64.4	58.5	64.7	60.7	59.4	61.4
SY Clearstone CL2	11.3	12.4	11.9	7.6	11.5	10.3	10.8	58.3	60.7	53.1	60.6	58.1	57.0	58.0
Utah 100	10.4	12.1	12.2	8.7	10.6	10.9	10.8	58.6	61.2	55.8	60.9	58.2	59.0	58.9
WB-Arrowhead	11.0	11.5	11.0	8.2	12.0	11.0	10.8	64.1	65.2	60.3	64.5	62.5	61.7	63.1
WB-Arrowhead / Keldin	11.0	12.2	11.1	8.3	11.6	10.5	10.8	60.3	63.2	58.9	63.5	61.8	60.8	61.4
Wheststone	11.2	11.8	11.5	8.3	10.6	---	10.7	60.2	62.3	57.9	59.9	62.0	---	60.5
Yellowstone	10.6	12.6	11.8	7.7	11.8	11.4	11.0	60.6	62.5	56.6	62.4	61.0	59.3	60.4
Bearpaw	---	---	---	7.7	10.8	11.5	10.0	---	---	---	63.8	61.2	60.1	61.7
Curlew	---	---	---	7.8	10.7	10.9	9.8	---	---	---	63.8	61.7	60.2	61.9
Deloris	---	---	---	8.4	9.4	11.4	9.7	---	---	---	64.5	63.8	62.4	63.6
Juniper / Deloris	---	---	---	9.7	10.7	11.4	10.6	---	---	---	62.6	59.7	59.9	60.7
Lucin-CL	---	---	---	9.3	11.0	11.6	10.6	---	---	---	66.2	64.0	62.5	64.2
UI SRG	---	---	---	8.4	9.5	11.4	9.8	---	---	---	63.7	57.4	58.3	59.8
Warhorse	---	---	---	8.7	12.6	13.0	11.4	---	---	---	62.4	55.6	54.8	57.6
Weston	---	---	---	9.3	10.5	13.4	11.1	---	---	---	63.6	63.6	60.3	62.5
Location Average	11.2	12.0	11.7	8.1	10.9	11.4	10.7	60.2	62.7	57.7	62.8	60.3	59.0	60.7
Hard White Winter Wheat														
Golden Spike (W)	11.2	10.8	11.1	7.6	8.8	10.7	10.0	63.5	67.4	58.0	65.0	61.0	60.9	62.6
IDO1101 (W)	11.4	11.2	10.6	8.4	10.4	10.9	10.5	62.0	64.0	59.3	62.2	58.3	60.6	61.1
IDO1209DH (W)	11.5	13.2	11.9	8.2	12.2	---	11.4	61.0	63.7	59.2	64.2	60.9	---	61.8
OR2100081H (W)	11.7	10.7	11.2	7.3	11.3	---	10.4	61.3	63.2	59.0	62.7	59.3	---	61.1
OR2110019H (W)	11.5	11.8	11.6	7.4	10.0	---	10.5	58.6	60.2	51.4	62.5	57.8	---	58.1
WA8184 (W)	11.8	12.0	12.0	7.9	10.7	---	10.9	56.5	60.8	54.8	60.8	59.2	---	58.4
WB3768 (W)	11.0	12.7	11.0	7.8	11.2	11.0	10.8	58.8	62.0	56.5	59.7	59.6	59.8	59.4
UI Silver (W)	---	---	---	8.0	10.3	10.7	9.7	---	---	---	65.6	60.6	57.8	61.4
UICF Grace (W)	---	---	---	8.0	10.7	13.0	10.6	---	---	---	59.2	52.3	54.3	55.3
Eltan (SWW)	---	---	---	---	10.2	---	10.2	---	---	---	---	64.2	---	64.2
Otto (SWW)	---	---	---	---	8.9	---	8.9	---	---	---	---	64.4	---	64.4
Location Average	11.4	11.8	11.3	7.8	10.4	11.3	10.3	60.2	63.0	56.9	62.4	59.8	58.7	60.7

mb= moisture basis

Table 78. Bake volume for hard winter wheat at Aberdeen, Kimberly, Rupert, Rockland, and Soda Springs, 2015.

Variety	Bake Volume (cc)					Average
	Aberdeen	Kimberly	Rupert	Rockland	Soda Springs	
Hard Red Winter Wheat						
Colter	1100	975	1100	975	1000	1030
DAS001	1150	1000	1150	975	---	1069
Garland	1025	825	900	725	1000	895
Greenville	1075	950	1000	900	975	980
IDO1103	1000	900	1025	975	---	975
Judee	1100	1000	1125	975	1000	1040
Juniper	1400	1075	1175	1150	950	1150
Juniper / Promontory	1150	1075	1400	975	975	1115
Keldin	925	900	975	---	---	933
LCS Azimut	950	950	900	800	---	900
LCS Colonia	1000	950	925	900	975	950
Manning	1050	1000	1150	875	1050	1025
Moreland	950	1100	1075	950	---	1019
Northern	1025	1150	1100	950	1050	1055
Norwest 553	1075	1025	1000	875	---	994
LCS Jet	950	925	1000	775	---	913
Promontory	1000	1025	925	775	1000	945
SY Clearstone CL2	1125	1050	950	975	925	1005
Utah 100	1100	950	875	900	1000	965
WB-Arrowhead	1125	1050	1000	1000	1000	1035
WB-Arrowhead / Keldin	1075	900	975	975	975	980
Whetstone	1175	1000	1025	1050	---	1063
Yellowstone	1125	950	1050	1075	1025	1045
Bearpaw	---	---	---	875	975	925
Curlew	---	---	---	925	1000	963
Deloris	---	---	---	950	1050	1000
Juniper / Deloris	---	---	---	1075	1000	1038
Lucin-CL	---	---	---	1075	1100	1088
UI SRG	---	---	---	900	950	925
Warhorse	---	---	---	1050	1050	1050
Weston	---	---	---	875	1200	1038
Location Average	1072	988	1035	942	1010	1003
Hard White Winter Wheat						
Golden Spike (W)	975	975	1075	825	950	960
IDO1101 (W)	1000	900	950	825	975	930
IDO1209DH (W)	1125	1000	1075	975	---	1044
OR2100081H (W)	1025	1050	1000	975	---	1013
OR2110019H (W)	1000	875	875	750	---	875
WA8184 (W)	1025	900	1150	900	---	994
WB3768(W)	1150	1000	975	925	950	1000
UI Silver (W)	---	---	---	950	1075	1013
UICF Grace (W)	---	---	---	850	1075	963
Location Average	1043	957	1014	886	1005	977

Table 79. Percent flour protein and flour yield for hard spring wheat at Rupert, Aberdeen, Idaho Falls, Ashton, and Soda Springs, 2015.

Variety	Flour Protein (14% mb)						Flour Yield (%)					
	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average
Hard Red Spring												
LCS Luna	12.6	13.0	13.3	13.1	13.5	13.1	61.8	64.9	62.6	62.3	62.4	62.8
LCS Iron	12.1	13.1	12.4	12.7	14.1	12.9	59.4	61.6	59.9	58.3	59.1	59.6
Alum	---	---	---	10.9	---	10.9	---	---	---	61.5	---	61.5
Bullseye	13.0	13.1	12.5	14.6	---	13.3	60.3	63.8	61.1	61.8	---	61.8
Cabernet	13.0	14.1	13.6	15.0	---	13.9	63.5	64.4	64.9	65.0	---	64.4
HRS3419	12.2	12.2	12.3	13.0	---	12.4	59.0	61.1	59.8	59.7	---	59.9
HRS3504	12.6	12.4	12.7	13.8	---	12.9	59.2	62.1	60.7	62.3	---	61.1
HRS3530	14.3	14.1	13.6	14.8	---	14.2	59.1	60.7	59.5	60.2	---	59.9
IDO862E	13.0	15.5	12.9	15.3	14.7	14.3	60.8	62.6	61.3	61.5	58.1	60.9
Jefferson	12.5	13.3	12.4	14.3	13.4	13.2	62.4	65.9	63.3	63.1	61.7	63.3
Kelse	13.6	14.6	13.9	15.4	14.2	14.3	57.6	59.7	60.0	59.8	59.4	59.3
SY Basalt	12.5	12.7	12.1	14.1	---	12.9	60.9	63.7	62.6	62.1	---	62.3
SY Coho	12.8	12.8	12.5	12.8	---	12.7	59.7	63.2	62.3	62.0	---	61.8
SY Selway	---	---	---	---	13.4	13.4	---	---	---	---	64.8	64.8
UI Winchester	13.2	13.3	12.5	14.4	12.7	13.2	59.1	61.7	60.5	60.8	61.4	60.7
WB9229	13.9	14.4	13.0	14.9	---	14.1	57.4	59.5	59.0	58.6	---	58.6
WB9411	12.9	13.5	12.8	15.5	14.0	13.7	54.6	57.9	57.5	58.7	60.9	57.9
WB9668	13.6	15.1	13.8	16.2	15.0	14.7	60.3	59.8	59.1	58.2	58.8	59.3
Location Average	13.0	13.6	12.9	14.2	13.9	13.3	59.7	62.0	60.9	60.9	60.7	61.1
Hard White Spring												
Dayn (W)	12.7	14.0	12.2	13.8	13.4	13.2	64.1	62.0	64.0	60.8	62.6	62.7
IDO1202S (W)	12.4	12.9	11.7	14.5	12.1	12.7	63.7	63.8	63.4	62.6	62.2	63.1
IDO1203 (W)	13.3	13.8	12.7	15.0	12.5	13.5	61.5	64.2	63.7	61.8	59.7	62.2
UI Platinum (W)	12.1	12.8	11.9	14.9	13.3	13.0	63.2	64.2	65.4	64.0	63.9	64.1
Klasic (W)	12.3	13.7	12.5	14.5	12.4	13.1	64.0	65.1	64.3	62.7	60.6	63.3
LCS Atomo (W)	12.1	13.0	12.5	12.8	12.1	12.5	56.0	58.5	56.9	56.5	52.8	56.1
LCS Star (W)	11.9	12.6	12.0	12.9	12.9	12.5	61.6	63.5	61.8	60.7	59.7	61.5
Snow Crest (W)	13.0	13.7	13.9	15.6	---	14.1	61.6	62.5	61.8	58.8	---	61.2
SY Teton (W)	12.0	12.0	11.6	12.5	11.8	12.0	62.3	63.3	62.4	63.1	61.4	62.5
WB-Paloma (W)	12.8	13.0	13.2	14.9	---	13.5	59.6	64.1	62.0	60.4	---	61.5
WB7328 (W)	13.8	14.5	13.8	15.2	---	14.3	60.8	61.9	60.7	59.0	---	60.6
WB7589 (W)	13.8	14.3	13.2	14.7	---	14.0	57.7	62.3	60.2	59.3	---	59.9
Location Average	12.7	13.4	12.6	14.3	12.6	13.2	61.3	63.0	62.2	60.8	60.4	61.6

(W) = White

mb= moisture basis

Table 80. Bake volume for hard spring wheat, 2015.

Variety	Bake Volume (cc)				Average
	Aberdeen	Ashton	Idaho Falls	Rupert	
Hard Red Spring Wheat					
LCS Luna	1175	1225	1150	1100	1163
LCS Iron	1125	1200	1150	1125	1150
Alum	---	950	---	---	950
Bullseye	1225	1250	1175	1175	1206
Cabernet	1225	1400	1175	1100	1225
HRS3419	1175	1075	1150	1150	1138
HRS3504	1100	1125	1225	1250	1175
HRS3530	1200	1400	1400	1400	1350
IDO862E	1200	1400	1200	1150	1238
Jefferson	1225	1250	1175	1050	1175
Kelse	1400	1300	1400	1400	1375
SY Basalt	1150	1125	1175	1150	1150
SY Coho	1150	1225	1200	1200	1194
UI Winchester	1225	1300	400	1200	1031
WB9229	1400	1250	1225	1400	1319
WB9411	1125	1400	1200	1150	1219
WB9668	1400	1400	1400	1150	1338
Location Average	1219	1251	1175	1197	1200

Hard White Spring Wheat

Dayn (W)	1150	1250	1150	1100	1163
IDO1202S (W)	1176	1125	1125	1025	1113
IDO1203 (W)	1400	1175	1075	1150	1200
UI Platinum (W)	1200	1225	1050	1100	1144
Klasic (W)	1400	1200	1175	1225	1250
LCS Atomo (W)	1400	1175	1025	1050	1163
LCS Star (W)	1400	1125	1175	1175	1219
Snow Crest (W)	1400	1400	1250	1000	1263
SY Teton (W)	1400	1175	1175	1200	1238
WB-Paloma (W)	1400	1400	1200	1200	1300
WB7328 (W)	1400	1400	1225	1175	1300
WB7589 (W)	1400	1275	1175	1200	1263
Location Average	1344	1244	1150	1133	1218

(W) = White

Addendum 1. Resistance reaction of winter wheat varieties in a heavily inoculated dwarf bunt (*Tilletia controversa*) nursery, Logan, UT. 2016 data and 2014-2016 three year averages. Thanks to our Cooperator Dr. David Hole, Utah State University.

Hard Red and Hard White (W) Winter Wheat Variety	2016 bunted heads (%)	3 Yr Ave bunted heads (%)	Overall disease rating
Bearpaw	55	46	S
Colter*	2	7	MS
Curlew*	-	0	VR
Deloris	0	0	VR
Eltan*	0	0	VR
Garland	1	1	R
Golden Spike (W)	0	0	VR
Greenville	0	1	R
IDO1101 (W)	0	0	VR
Judee	9	23	S
Juniper	0	0	VR
Keldin	10	25	S
LCI 13DH04-16 (W)	73	-	S
LCI 13DH14-53 (W)	82	-	S
LCI 13DH22-22 (W)	55	-	S
LCI13DH14-83 (W)	55	-	S
LCS Colonia	25	17	S
LCS Jet	60	44	S
Loma	85	-	S
Lucin-CL	5	16	S
Manning	0	1	R
Northern	58	-	S
Norwest 553	78	44	S
OR2110664 (W)	85	-	S
OR2110679 (W)	70	-	S
OR2111025 (W)	40	-	S
OR2120012R	53	-	S
OR2120276H (W)	43	-	S
Promontory	0	2	R
SY Clearstone CL2	2	5	MR
SY Touchstone (W)	45	-	S
UI Silver (W)	0	0	VR
UI SRG	0	0	VR
UICF Grace (W)	0	1	R
Utah 100	0	0	VR
WA8252 (W)	70	-	S
Warhorse	65	-	S
WB3768 (W)	2	5	MR to MS
Whetstone	63	54	S
Yellowstone	2	9	MS

Soft White Winter Wheat Variety	2016 bunted heads (%)	3 Yr Ave bunted heads (%)	Overall disease rating
Bobtail	21	30	S
Brundage	33	24	S
Bruneau	15	9	MS
Eltan	3	2	R
IDN-01-10704A	7	10	MS
IDN-02-29001A	10	6	MS
IDN06-03303B	9	3	MS
IDN06-18102A	30	10	S
IDN07-28017B	7	2	MS
Jasper*	70	45	S
LCS Artdeco	58	31	S
LCS Biancor	53	24	S
LCS Drive	65	22	S
LOR-833*	35	19	S
LOR-913*	20	16	S
LWW10-1073	3	4	MR
LWW14-73163	9	3	MS
Madsen	7	7	MS
Norwest Duet*	10	7	MS
Norwest Tandem*	58	39	S
OR2110526	43	14	S
Otto	1	1	R
Stephens	11	9	MS
SY Ovation	33	27	S
SY 107	9	4	MS
SY Assure*	7	4	MS
UI Castle*	15	8	MS
UI Magic*	35	19	S
UI Palouse*	65	42	S
UI Sparrow	0	0	VR
UI-WSU Huffman	20	22	S
WA8206	13	4	MS
WA8232	52	17	S
WA8234	23	8	S
WB 456	35	24	S
WB-528	10	5	MS
WB1376CLP	0	8	MR
WB1529	1	1	R
WB1783	0	0	VR
WB1783	0	0	VR

*2 yr ave

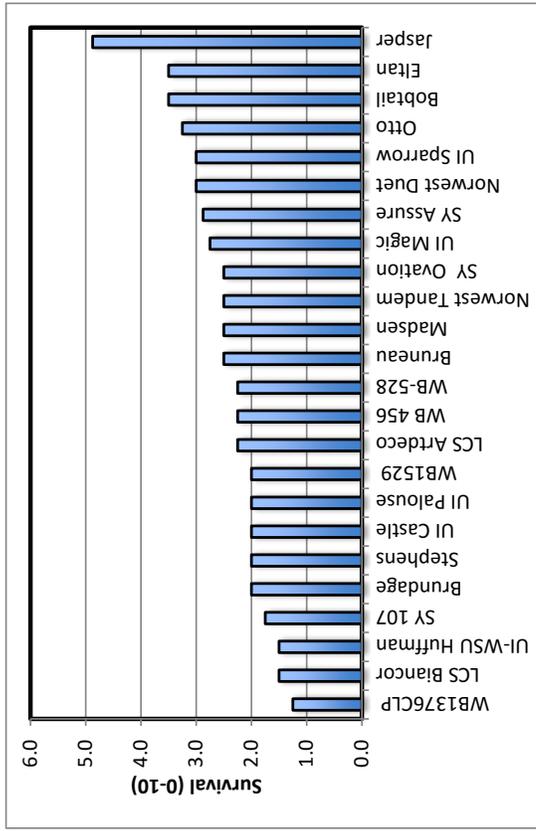
*2 yr ave

- 0 VR = very resistant
- 1 - 2 R = resistant
- 3 - 5 MR = moderately resistant
- 6 - 15 MS = moderately susceptible
- > 15 S = susceptible

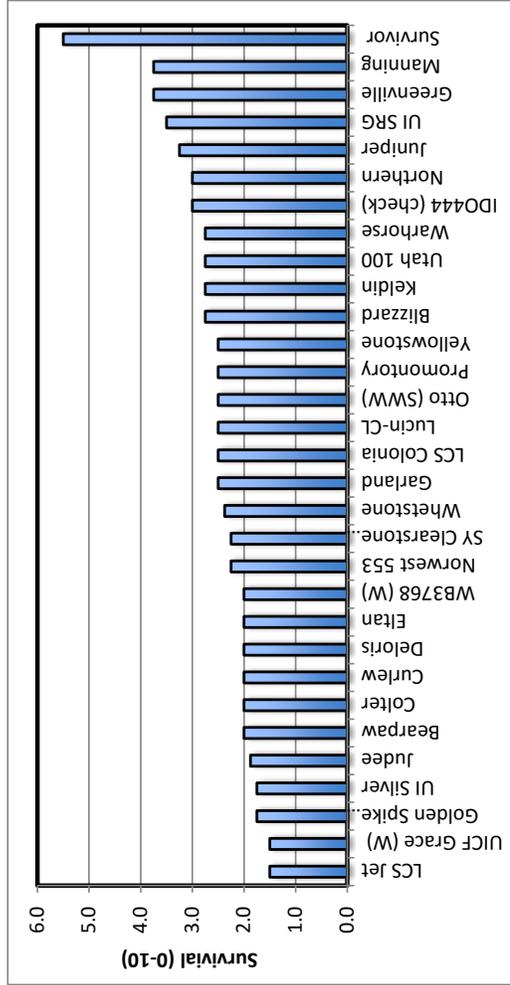
Addendum 2. Snow mold survival of winter wheat on a scale of 0 - 9, where 0 is no stand and 9 is full stand. Under severe snow mold conditions in 2016, stands were very poor.

Soft White Winter		2015 - 2016	
Variety	average	average	
WB1376CLP	1.3		
LCS Biancor	1.5		
UI-WSU Huffman	1.5		
SY 107	1.8		
Brundage	2.0		
Stephens	2.0		
UI Castle	2.0		
UI Palouse	2.0		
WB1529	2.0		
LCS Artdeco	2.3		
WB 456	2.3		
WB-528	2.3		
Bruneau	2.5		
Madsen	2.5		
Norwest Tandem	2.5		
SY Ovation	2.5		
UI Magic	2.8		
SY Assure	2.9		
Norwest Duet	3.0		
UI Sparrow	3.0		
Otto	3.3		
Bobtail	3.5		
Eltan	3.5		
Jasper	4.9		

Soft White Winter wheat



Hard Red and White Winter Wheat



Hard Winter		2015 - 2016	
Variety	average	average	
LCS Jet	1.5		
UICF Grace (W)	1.5		
Golden Spike (W)	1.8		
UI Silver	1.8		
Judee	1.9		
Bearpaw	2.0		
Colter	2.0		
Curlew	2.0		
Deloris	2.0		
Eltan	2.0		
WB3768 (W)	2.0		
Norwest 553	2.3		
SY Clearstone CL2	2.3		
Whetstone	2.4		
Garland	2.5		
LCS Colonia	2.5		
Lucin-CL	2.5		
Otto (SWW)	2.5		
Promontory	2.5		
Yellowstone	2.5		
Blizzard	2.8		
Keldin	2.8		
Utah 100	2.8		
Warhorse	2.8		
IDO444 (check)	3.0		
Northern	3.0		
Juniper	3.3		
UI SRG	3.5		
Greenville	3.8		
Manning	3.8		
Survivor	5.5		

Addendum 3. Stripe rust ratings for 2016 winter wheat. Stripe rust was severe in the southeastern portions of Idaho, from Arbon Valley area to Aberdeen.

Ratings were based on an index of percent tissue affected by stripe rust multiplied by infection type.

2016 Disease Ratings in Aberdeen

Hard Winter Wheat Under extremely high disease pressure

Variety	Stripe Rust Infection type	Percent leaf area infected	IT x PLAI %	Stripe rust Rating
Colter	7.0	24	1.66	S
Garland	7.0	58	4.03	VS
Greenville	7.3	15	1.09	S
IDO1101 (W)	7.0	24	1.66	S
Judce	6.0	8	0.50	MR
Keldin	7.0	26	1.84	S
LCL13DH04-16 (W)	7.5	10	0.75	MS
LCL13DHI4-53 (W)	7.0	43	2.98	VS
LCL13DH22-22 (W)	8.0	8	0.62	MR
LCL13DHI4-83 (W)	7.0	40	2.80	VS
LCS Colonia	6.3	2	0.13	R
LCS Jet	7.0	3	0.21	MR
Loma (MT1224)	6.0	15	0.87	MS
Manning	7.0	16	1.14	S
Northern	6.0	15	0.90	MS
Norwest 553	6.5	2	0.10	R
OR2110664 (W)	7.5	6	0.43	MR
OR2110679 (W)	7.0	2	0.14	R
OR2111025 (W)	7.0	4	0.28	MR
OR2120012R	7.0	7	0.51	MR
OR2120276H (W)	7.0	5	0.33	MR
SY Clearstone CL2	7.0	15	1.05	S
SY Touchstone (W)	7.0	3	0.21	MR
UI Silver	7.0	14	0.96	S
Utah 100	7.0	14	0.96	S
WA8252 (W)	6.8	14	0.93	MS
Warhorse	7.0	10	0.67	MS
WB3768 (W)	7.0	24	1.66	S
Wheatstone	7.0	16	1.14	S
Yellowstone	7.0	24	1.66	S
Average	6.9	15		
LSD (0.05)	5.0	4		
CV	4.6	17		
P>F	<0.0001	<0.0001		

(W) = White
Infecton Type: on a scale from 0 to 9, where 0 is immune, 1 is resistant, and 8 to 9 is very susceptible.

TIPS:

- R to MR - should not need fungicides
- R to MR - should not need fungicides unless disease pressure becomes high
- MR to MS - consider spraying with protective fungicides under medium to high disease pressure
- S = will need protective fungicide application when stripe rust is present
- VS = will need fungicides in the presence of stripe rust, at times up to three applications in severe years

2016 Disease Ratings in Aberdeen

Soft White Winter Wheat Under extremely high disease pressure

Variety	Stripe Rust Infection type	Percent leaf area infected	IT x PLAI %	Stripe rust Rating
Bobtail	3.8	1	0.04	R
Brundage	8.1	76	6.20	VS
Bruneau	7.1	7	0.48	MR
BZGW09-489	7.0	7	0.51	MR
IDN-01-10704A	6.5	6	0.41	MR
IDN-02-29001A	5.3	1	0.07	R
IDN06-03303B	7.0	9	0.63	MS
IDN06-18102A	7.1	6	0.45	MR
IDN07-28017B	6.0	1	0.06	R
Jasper	7.0	5	0.32	MR
LCS Ardleco	6.3	17	1.06	MS
LCS Biancor	2.6	1	0.01	R
LCS Drive	1.3	0	0.00	R
LOR-833	3.5	1	0.03	R
LOR-913	0.0	0	0.00	R
LWW14-73163	3.5	1	0.03	R
Madsen	7.0	18	1.24	S
Norwest Duet	4.3	2	0.03	R
Norwest Tandem	5.5	2	0.11	R
OR2110526	5.8	4	0.23	MR
Stephens	5.8	24	1.37	S
SY Ovation	6.3	4	0.22	MR
SY Assure	3.5	1	0.04	R
UI Castle	3.5	1	0.02	R
UI Magic	7.1	21	1.51	S
UI Palouse	7.4	6	0.46	MR
UI Sparrow	7.0	5	0.32	MR
UI-WSU Huffman	6.8	5	0.34	MR
WA8206	1.5	1	0.01	R
WA8232	1.3	1	0.01	R
WA8234	5.9	1	0.07	R
WB-456	7.0	6	0.42	MR
WB-528	6.6	9	0.56	MR
WB1376CLP	7.3	7	0.53	MR
WB1529	5.9	2	0.12	R
WB1783	5.3	1	0.05	R
Average	5.3	7		
LSD (0.05)	2.2	2		
CV	29.7	21		
P>F	<0.0001	<0.0001		

2016 Disease Ratings in Rockland

Hard Winter Wheat

Variety	Stripe Rust Infection type	Percent leaf area infected	IT x PLAI %	Stripe rust Rating
Bearpaw	7.5	48	3.56	VS
Colter	6.0	9	0.54	MS
Curlew	6.0	5	0.30	MR
Deloris	8.5	55	4.68	VS
Eltan (SWW)*	8.0	43	3.40	VS
Garland	8.0	50	4.00	VS
Golden Spike (W)	8.0	25	2.00	S
Greenville	5.5	4	0.19	R
IDO1101 (W)	6.0	8	0.45	MS
Judce	4.5	9	0.38	MR
Juniper	6.5	7	0.42	MS
Keldin	8.0	18	1.40	S
LCL13DH04-16 (W)	5.5	6	0.30	MR
LCL13DHI4-53 (W)	8.0	15	1.20	S
LCL13DH22-22 (W)	8.0	15	1.20	S
LCL13DHI4-83 (W)	6.5	10	0.65	MS
LCS Colonia	2.5	1	0.01	R
LCS Jet	5.0	7	0.33	MR
Loma (MTS1224)	7.5	10	0.75	MS
Lucin-CL	8.5	55	4.68	VS
Manning	5.5	4	0.22	MR
Northern	6.0	3	0.18	R
Norwest 553	0.0	0	0.00	R
OR2110664 (W)	5.5	2	0.11	R
OR2110679 (W)	6.0	2	0.12	R
OR2111025 (W)	2.5	2	0.04	R
OR2120012R	5.5	5	0.25	MR
OR2120276H (W)	5.5	2	0.11	R
Promontory	7.0	9	0.63	MS
SY Clearstone CL2	5.5	3	0.17	R
UI Silver	5.0	6	0.30	MR
UI SRG	4.0	2	0.06	R
UICF Grace (W)	8.0	23	1.80	S
Utah 100	7.0	2	0.14	R
WA8252	6.0	15	0.90	MS
Warhorse	7.0	7	0.46	MS
WB1376CLP (SWW)	0.0	0	0.00	R
WB3768 (W)	6.0	5	0.30	MR
Yellowstone	6.0	8	0.48	MS
Average	5.9	13		
LSD (0.05)	2.4	12		
CV	20	44		
P>F	<0.0001	<0.0001		

*Soft white winter check

Addendum 4. Stripe rust ratings for 2016 spring wheat. Stripe rust was severe in the southeastern portions of Idaho, from Arbon Valey area to Aberdeen.

Ratings were based on an index of percent tissue affected by stripe rust multiplied by Infection type.

Hard Spring Wheat	Stripe Rust Infection type	Percent leaf area infected	IT x PLAI %	Relative RATING
WB9518	1.5	0.3	0.0038	R
SY3015-8	3.0	0.5	0.0150	R
WB9668	3.0	0.5	0.0150	R
Dayn (W)	6.0	1.5	0.0900	R
WB9200	5.3	1.8	0.0919	R
WB9411	4.3	3.8	0.1594	R
LCS Iron	1.3	15.0	0.1875	R
LCS Luna	6.5	3.0	0.1950	R
HRS 3419	6.5	3.3	0.2113	MR
Cabernet	6.5	3.5	0.2275	MR
LCS Star (W)	4.3	5.8	0.2444	MR
SY Basalt	6.6	7.0	0.4638	MR
WB7589 (W)	7.0	6.8	0.4725	MR
WA8240 (CLP)	7.0	9.0	0.6300	MR
SY Coho	7.0	11.3	0.7875	MS
Alum	5.8	15.0	0.8625	MS
LCS Atomo (W)	7.5	11.5	0.8625	MS
Alzada (D)	7.0	13.8	0.9625	MS
SY-Teton (W)	7.0	16.3	1.1375	MS
IDO1602S	7.1	16.3	1.1578	MS
WA8262	6.3	20.0	1.2500	MS
WB9377	7.3	20.0	1.4500	S
HRS 3616	6.9	21.3	1.4609	S
WB7328 (W)	7.0	23.8	1.6625	S
UI Platinum (W)	6.1	32.5	1.9906	S
Kelse	7.0	31.3	2.1875	S
Bullseye	6.5	35.0	2.2750	S
IDO1202S (W)	7.0	38.8	2.7125	S
Jefferson	7.0	41.3	2.8875	S
HRS 3504	7.8	42.5	3.2938	VS
IDO1203-A (W)	7.0	47.5	3.3250	VS
WB-Paloma (W)	7.1	47.5	3.3844	VS
Snow Crest (W)	7.0	50.8	3.5525	VS
HRS 3530	7.1	57.5	4.0969	VS
Klasic (W)	7.0	70.0	4.9000	VS

Average	6.1	21.0
LSD (0.05)	0.8	12.0
CV	9.4	38.0
P>F	<0.0001	<0.0001

Soft White Spring Wheat	Stripe Rust type	Percent leaf area infected	IT x PLAI %	Relative G
Seahawk	0.5	0.0	0.0000	R
Melba (club)	3.6	3.0	0.1088	R
WB6121	6.8	2.0	0.1350	R
Tekoa	4.5	3.3	0.1463	R
Diva	6.3	5.8	0.3594	MR
WB6430	7.0	5.5	0.3850	MR
SY Saltese	6.8	8.0	0.5400	MR
IDO1403S	8.1	10.0	0.8125	MS
Louise	7.0	14.3	0.9975	MS
12-SW-068	6.5	22.5	1.4625	S
IDO1405S	6.6	28.8	1.9047	S
Alturas	7.0	41.3	2.8875	S
UI Stone	7.0	41.3	2.8875	S
WB-1035CI	8.8	33.8	2.9531	VS
UI Pettit	8.0	57.5	4.6000	VS
Babe	8.0	75.0	6.0000	VS

Average	6.4	22.0
LSD (0.05)	0.9	4.0
CV	10.3	11.0
P>F	<0.0001	<0.0001

TIPS:

R to MR - should not need fungicides

MR - should not need fungicides unless disease pressure becomes high

MR to MS - consider spraying with protective fungicides under medium to high disease pressure

S = will need protective fungicide application when stripe rust is present

VS = will need fungicides in the presence of stripe rust, at times up to three applications in severe years
consider spraying at herbicide timing to prevent infection in S and VS varieties.

Infection Type: on a scale from 0 to 9, where 0 is immune,

1 is resistant, and 8 to 9 is very susceptible.

Addendum 5. Results from the 2015 FHB Screening nursery, Aberdeen, ID, where plots were inoculated with corn spawn colonized with *Fusarium graminearum* . Results are based on one year's data. Rankings may change from year to year and with high disease pressure.

2015 Fusarium Head Blight disease index of hard spring wheat varieties. Lines with the same letter behind the rating are not significantly different. Plots were inoculated in Aberdeen.

Variety	FHB* Index		Overall Rating
Durum			
Alzada (D)	17.7	e-o	S
Hard red spring			
HRS 3419	7.1	l-o	MR
HRS 3504	8.7	k-o	MR
LCS Iron	8.9	k-o	MR
Cabernet	9.3	k-o	MR
HRS 3530	9.5	k-o	MR
WB9411	10.0	j-o	MR
WB9229	11.6	i-o	MR
SY Coho	16.3	f-o	MR
SY Basalt	20.0	d-n	MS
Kelse	20.4	c-n	MS
Bullseye	21.2	c-m	MS
UI Winchester	22.6	c-k	MS
WB9668	27.1	b-h	S
SY Selway	29.4	a-g	S
IDO862E	32.2	a-e	S
Jefferson	33.6	a-d	S
Hard white spring			
IDO1202S	13.9	g-o	MR
LCS Luna	14.5	g-o	MR
UI Platinum	15.8	g-o	MR
SY Teton	19.4	d-n	MS
Dayn	19.9	d-n	MS
IDO1203	19.9	d-n	MS
LCS Star	23.9	c-k	MS
WB7328	27.6	b-h	S
LCS Atomo	31.5	a-f	S
WB7589	34.1	a-d	S
Snow Crest	39.2	abc	S
WB-Paloma	42.3	ab	VS
Klasic	44.4	a	VS

*FHB index = (% Severity x % Incidence)/100

- 0 VR = very resistant
- 1 - 2 R = resistant
- 3 - 17 MR = moderately resistant
- 18 - 25 MS = moderately susceptible
- 26 - 40 S = susceptible
- 41 - 100 VS = very susceptible

2015 Fusarium Head Blight disease index of soft white spring wheat varieties. Lines with the same letter behind the rating are not significantly different.

Variety	FHB* Index		Overall Rating
Soft white spring			
IDO 851	3.2	o	MR
M12001	5.2	mo	MR
Alpowa	6.2	mno	MR
Seahawk	6.6	l-o	MR
Alturas	12.5	h-o	MR
UI Stone	14.3	g-o	MR
WA 8189	14.9	g-o	MR
Alum	20.7	c-n	MS
Diva	22.0	c-l	MS
Babe	25.5	c-j	S
WB6430	25.8	c-i	S
WA 8214	26.9	b-i	S
UI Pettit	37.0	abc	VS

Data analyzed using PROC GLIMMIX in SAS

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Addendum 5. Results from the 2015 FHB Screening nursery, Aberdeen, ID, where plots were inoculated with corn spawn colonized with *Fusarium graminearum*. Results are based on one year's data. Rankings may change from year to year and with high disease pressure.

2015 Fusarium Head Blight disease index of spring barley varieties. Lines with the same letter behind the rating are not significantly different.

Variety	FHB*	Overall Rating
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Two-row feed

RWA 1758	0.6 ij	MR
Vespa	1.7 hij	MR
Champion	1.8 f-j	MR
03ARS391-34	2.1 f-j	MS
Xena	2.3 e-j	MS
Clearwater (hullless)	2.4 e-j	MS
Baronesse	2.7 e-j	MS
Claymore	2.8 e-j	MS
Sawtooth	4.8 d-j	MS
08ARS206-17	5.7 c-j	S
2Ab08-X05M010-82	5.8 c-j	S
Oreana	6.6 c-i	S
Idagold II	7.1 c-h	S
Lenetah	8.0 c-f	S
Harriman	8.3 cde	S
Tetonia	11.7 bc	S

Six row feed

2Ab04-X01084-27	1.5 hij	MR
Menan (01Ab9663)	1.8 f-j	MR
Millennium	4.7 d-j	MS
Herald	7.5 c-g	S
UT2183-85	10.8 bcd	S
UT10901-66	17.5 ab	S
Goldeneye	19.9 a	VS

Two-row food

2Ab07-X031098-31	1.0 hij	MR
CDC Fibar (hullless)	4.1 e-j	MS
2Ab09-X06F084-31	11.5 bc	S
Julie (hullless)	11.8 bc	S
Kardia (2Ab09-X06F084-51)	14.8 ab	S
Transit	17.8 ab	VS

*FHB index = (% Severity x % Incidence)/100

0	R = resistant
1 - 2	MR = moderately resistant
3 - 5	MS = moderately susceptible
6 - 15	S = susceptible
15 - 40	VS = very susceptible

2015 Fusarium Head Blight disease index of spring barley varieties. Lines with the same letter behind the rating are not significantly different.

Variety	FHB*	Overall Rating
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Two-row malt

Conrad	0.6 ij	MR
Harrington	1.0 hij	MR
Hockett	1.4 hij	MR
ND Genesis	1.6 hij	MR
AC Metcalfe	2.3 e-j	MS
ABI Growler	2.8 e-j	MS
CDC Copeland	2.9 e-j	MS
Moravian 69	3.2 e-j	MS
ABI Voyager	3.2 e-j	MS
LCS Genie	3.3 e-j	MS
Merem	3.4 e-j	MS
Merit 57	3.7 e-j	MS
ACC Synergy	4.1 e-j	MS
LCS Overture	4.5 e-j	MS
ABI Balster	4.6 e-j	MS
LCS Odyssey	5.8 c-j	MS
CDC Meredith	8.0 c-f	S

Six-row malt

Quest	0.2 j	MR
Lacey	1.5 hij	MR
Tradition	2.5 e-j	MR
Celebration	2.8 e-j	MR

Data analyzed using PROC GLYMMIX in SAS

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Addendum 6. Summary of spring wheat tolerance and resistance to *Heterodera avenae* for data grouped over two years.

Cultivar	White females/ plant ^v	Resistance rating ^w	Yield increase ^x (%)	Tolerance rating ^y	MR + MT ^z
<i>Soft white</i>					
LCS Star	2.6	R	15.5	MI	
LCS Iron	16.1	S	24.1	MI	
Alpowa	8.9	MS	7.1	T	
Alturas	25	S	16.1	MI	
Babe	15.7	S	20.4	MI	
Cataldo	5.2	MR	39.1	I	
Penawawa	21.7	S	17	MI	
UI Petit	19.7	S	17.7	MI	
UI Stone	11.1	MS	18.7	MI	
Seahawk	26.6	VS	17.2	MI	
WB6121	20.5	S	11.6	MT	
WB6430	28.9	VS	14.5	MT	
<i>Hard red and hard white</i>					
Alzada	21.4	S	12.5	MT	
Blanca Grande (W)	20.8	S	10.4	MT	
Bullseye	24.2	S	16.6	MI	
WB9576	7.8	MS	5.8	T	
Cabernet	15.2	S	21.7	MI	
Choteau	11.9	MS	18.3	MI	
Dayn (W)	7.5	MS	14.3	MT	
Glee	12.4	S	16.9	MI	
UI Platinum	8.9	MS	20.7	MI	
Jefferson	7.7	MS	38.7	I	
Kelse	13	S	18.3	MI	
Klasic (W)	4.4	MR	15	MT	X
Snow Crest (W)	26	VS	23.7	MI	
SY Basalt	24.7	S	23.8	MI	
UI Winchester	19.3	S	19.7	MI	
Volt	31.2	VS	35.4	I	
WB-Rockland	1.5	R	14.5	MT	X
WB9229	10.4	MS	26.6	MI	
WB-Idamax (W)	16.2	S	22.4	MI	
WB-Paloma (W)	26.2	VS	25.8	MI	
Westbred 936	60.8	VS	41.9	I	

^v Number of *H. avenae* white females produced/plant for the control (no-nematicide) treatment.

^w Cultivars were rated as very resistant (VR; ≤ 1 swollen female/plant), resistant (R; 1.1 to 3), moderately resistant (MR; 3.1 to 6), moderately susceptible (MS; 6.1 to 12), susceptible (S; 12.1 to 25), or very susceptible (VS; > 25).

^x Percentage increase in grain yield due to application of nematicide.

^y Tolerance ratings were very tolerant (VT; $< 5\%$ yield response to nematicide), tolerant (T; 5 to 10%), moderately tolerant (MT; 10 to 15%), moderately intolerant (MI; 15 to 30%), intolerant (I; 30 to 50%), or very intolerant (VI; $> 50\%$).

^z Cultivars that were neither resistant nor tolerant but which met a balanced criteria of being at least both moderately resistant ($\leq 6\%$ swollen females/plant) and moderately tolerant ($\leq 15\%$ yield increase with nematicide).

Addendum 7. Spring barley tolerance and resistance to *Heterodera avenae* ; data are means of trials conducted during two successive years.

Market class and cultivar	White females¹	Resistance rating²	Yield increase³	Tolerance rating⁴	MR + MT⁵
<u>2-row feed barley</u>					
Julie	6.2	MS	1.5	VT	
RWA 1758	6.3	MS	4.7	VT	
Tetonia	13.1	S	4.6	VT	
Vespa	10.1	MS	3	VT	
Baronesse	6.2	MS	8.7	T	
Champion	5.9	MR	7.2	T	X
Lenetah	2.6	R	9.8	T	X
Xena	3.4	MR	5.4	T	X
CDC McGwire	8.6	MS	11.8	MT	
Idagold II	4.5	MR	10.6	MT	X
Spaulding	14.5	S	12.1	MT	
Transit	4.5	MR	10.5	MT	X
CDC Fibar (hull-less)	4.4	MR	18.2	MI	
Clearwater	7.3	MS	23.1	MI	
<u>2-row malt barley</u>					
ABI Balster	12.2	S	1.5	VT	
Copeland	19.4	S	4.4	VT	
Merit	15.3	S	3.8	VT	
Merem	11.8	MS	5.6	T	
Merit 57	26.4	VS	6.5	T	
Overture	17.1	S	9.1	T	
Pinnacle	19.1	S	6.9	T	
Genie	33.6	VS	10.7	MT	
Harrington	20.8	S	10.3	MT	
Meredith	13.8	S	13.6	MT	
ABI Voyager	38.6	VS	19	MI	
Conrad	9.8	MS	16.8	MI	
Hockett	24.1	S	16.6	MI	
Metcalf	16.5	S	16.8	MI	
Odyssey	0.9	VR	15.5	MI	
<u>6-row feed barley</u>					
Millenium	5	MR	2.6	VT	X
Herald	10.5	MS	5.6	T	
Goldeneye	5.5	MR	13.8	MT	X
Steptoe	5.3	MR	17.2	MI	
<u>6-row malt barley</u>					
Menan	7.8	MS	0.8	VT	
Quest	6.4	MS	3	VT	
Legacy	3.8	MR	27.2	MI	
Morex	10.2	MS	17.6	MI	
Tradition	5.6	MR	20.8	MI	
Celebration	6.4	MS	30.5	I	

^v Number of *H. avenae* white females produced/plant for the control (no-nematicide) treatment.

^w Cultivars were rated as very resistant (VR; ≤ 1 swollen female/plant), resistant (R; 1.1 to 3), moderately resistant (MR; 3.1 to 6), moderately susceptible (MS; 6.1 to 12), susceptible (S; 12.1 to 25), or very susceptible (VS; >25).

^x Percentage increase in grain yield due to application of nematicide.

^y Tolerance ratings were very tolerant (VT; $<5\%$ yield response to nematicide), tolerant (T; 5 to 10%), moderately tolerant (MT; 10 to 15%), moderately intolerant (MI; 15 to 30%), intolerant (I; 30 to 50%), or very intolerant (VI; $>50\%$).

^z Cultivars that were neither resistant nor tolerant but which met a balanced criteria of being at least both moderately resistant ($\leq 6\%$ swollen females/plant) and moderately tolerant ($\leq 15\%$ yield increase with nematicide).

Web Resources for Southcentral and Southeast Idaho Grain Production



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www.barley.idaho.gov



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