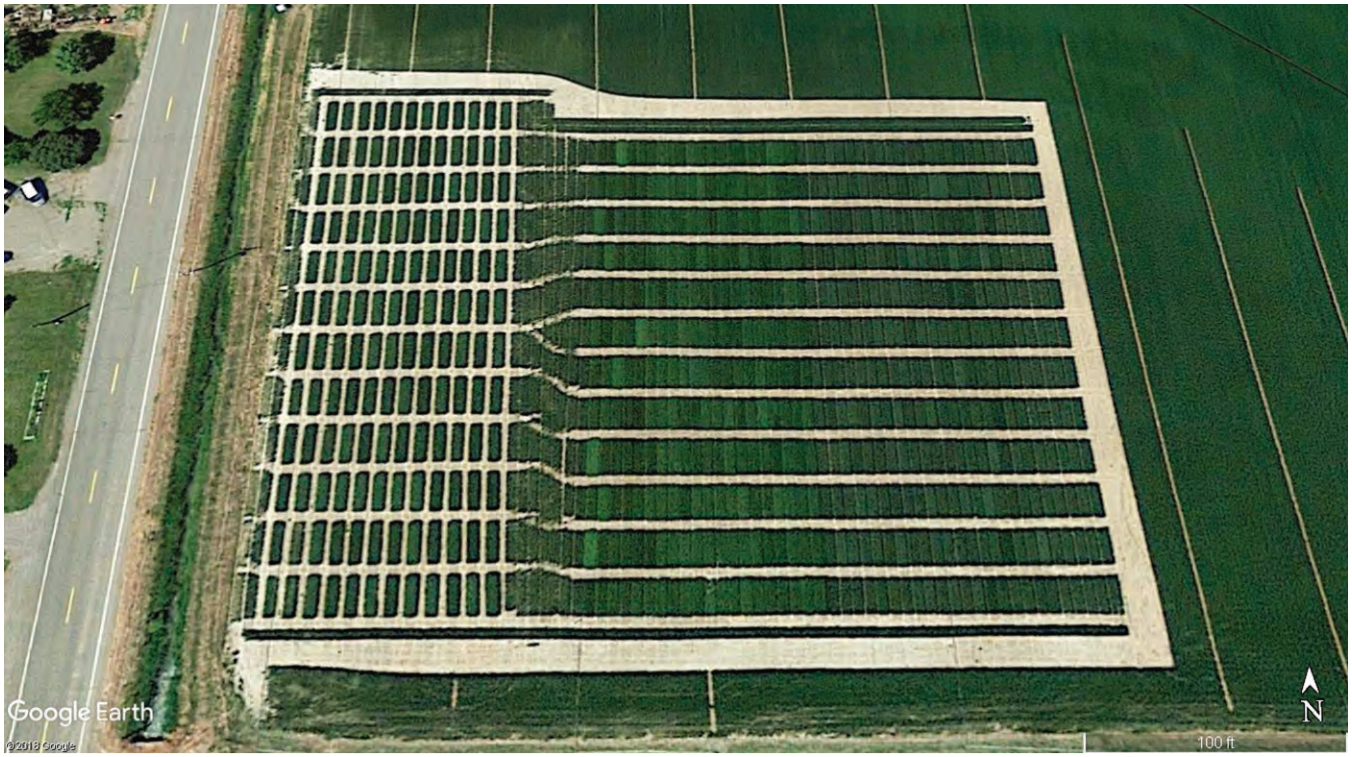
Research Bulletin 196
January 2019



2018 Small Grains Report

Southcentral and Southeast Idaho Cereals Research & Extension Program

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

University of Idaho
College of Agricultural and Life Sciences

Cover Images

Top: 2017 Idaho Falls Spring Nurseries, plotted without GPS. Image copyright 2018 Google. Bottom left: Stripe Rust in WestBred 936. Bottom center: Fusarium Head Blight *(Fusarium graminearum)* on wheat. Bottom right: Loose Smut *(Ustilago tritici)* on wheat.

Southcentral and Southeastern Idaho Cereals Research and Extension Program
www.uidaho.edu/extension/cereals/scseidaho

Published and distributed by the Idaho Agricultural Experiment Station, Mark McGuire, Director. University of Idaho College of Agricultural and Life Sciences, Moscow, Idaho 83844-2337.

ACKNOWLEDGEMENTS

Idaho wheat and barley producers, through cooperative research and extension grants from the Idaho Wheat and Barley Commissions, provided partial funding for these small grain performance evaluations. Support was also provided by the University of Idaho Cooperative Extension System, the Idaho Agricultural Experiment Station, and by fees paid by plant breeding companies. This report represents the collective efforts of many individuals. University of Idaho Extension County Educators coordinated many of the off-station nurseries and field days. Grower-cooperators provided their time, land, and other inputs for management of these trials and appreciation is expressed to them for their support. The UI Wheat Quality Laboratory at Aberdeen analyzed the quality for harvested wheat samples. Appreciation is also expressed to the numerous support personnel who assisted with trial establishment, maintenance, harvest, grain processing, and data analysis. Finally, cereal breeders throughout the Northwest are recognized for their contributions since the nurseries would not be possible without their entries. The authors wish to thank all who have contributed to the success of this project.

Grower Cooperators

Kyle Wangemann and Scott Brown - Soda Springs
Mark and Craig Ozburn - Soda Springs
Gilbert and Carl Hofmeister - Rockland
Trevor Davey - Ririe
BYU-I, Chris Humphreys - Rexburg
Duane Grant and Alan Mohlman - Rupert
Alan Baum - Ashton
Luke Adams - Rupert
Marc Thiel - Idaho Falls

Cereals Research and Extension Employees

Ester Serna Martha Carrillo Kira Shelman

Other UI Employees

Randy Gamble Kristi Copeland Sherrie Mauroner
Lyona Anderson Ericka Ziebarth Mary Corbridge
Beth Brune

UI Extension Educators

Lance Ellis - Fremont County
Reed Findlay - Bannock and Bingham Counties
Joel Packham - Cassia County
Jason Thomas - Minidoka County
Steve Harrison and Justin Hatch - Caribou County
Wayne Jones - Bonneville County
Stuart Parkinson - Franklin County
Jon Hogge - Madison County
Terrell Sorensen - Power County

About the Authors

Juliet Marshall is the Cereals Cropping Systems Agronomist & Pathologist with the UI SC & SE Idaho Cereals Extension Program.
Chad Jackson is a Research Specialist with the UI SC & SE Idaho Cereals Extension Program.
Tod Shelman is a Scientific Aide II with the UI SC & SE Idaho Cereals Extension Program.
Linda Jones is a Technical Aide II with the UI SC & SE Idaho Cereals Extension Program.
Suzette Arcibal is a Laboratory Technician with the UI SC & SE Idaho Cereals Extension Program.
Katherine O'Brien is the Lab Manager of the UI Wheat Quality Laboratory at Aberdeen.

Peer Reviewed by

John Burns – Washington St Univ., prof. emeritus
Dale Clark – Northern Seed
David Hole – Utah State University
Margaret Moll – University of Idaho

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.

☙ Table of Contents ❧

Quality and End-use Data From 2017 Growing Year

Disease Rating Addendums

2018 Small Grains Report Table & Chart List

2018 Small Grains Report for Southcentral and Southeastern Idaho

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

Additions and Changes:

A new location in Rexburg consisting of hard winter and soft white winter wheat was planted in the fall of 2017 in conjunction with BYU-Idaho. The Soda Springs spring malt and feed barley nurseries were expanded from single rep demonstration plots to having some varieties replicated. The six-row spring barley nurseries were discontinued but a few six-row barley varieties were included in the two-row spring feed barley nurseries. The 2017 quality data for SRC (Solvent Retention Capacity) was 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 2018, as well as milling and baking data from trials harvested in 2017.

Materials & Methods

Locations

Cereal trials were established at seven winter and five spring locations throughout SC and SE Idaho during the fall of 2017 and the spring of 2018. For location details, please see the descriptions on pages 5 to 12. 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, the trials at Rexburg were grown on the BYU-Idaho farm, 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 winter 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. Spring locations were planted 5 feet wide by 20 feet long then sprayed or tilled back to 16 feet. All entries were replicated 4 times at each location in a randomized complete block design. 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 wheat, soft white spring wheat, 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 12. Planting and harvesting operations by university personnel were timed to approximately coincide with corresponding cooperator operations. All nurseries, aside from Rexburg, were harvested with Wintersteiger Classic small plot combines using Harvestmaster 800 Classic GrainGage systems and Mirus software. The Rexburg location was harvested by BYU-Idaho personnel using a Haldrup model C65 small plot combine and the onboard weigh system.

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 2018 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 59. 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 2018 harvest in this report. Data are given for these characteristics from the 2017 harvest and are found in tables 67-82.

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.
- SRC (Solvent Retention Capacity): a measure of the flour performance in absorbing water and flour quality.

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" x ¾" slotted 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" x ¾" screen after shaking.

Statistical Analyses

Data from each nursery were analyzed using SAS 9.4 software with the PROC GLM procedure. Fisher's protected LSD (α=.05) was used for mean comparisons.

Statistical Interpretation

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

variation and greater precision. Most tables that do not have the LSD and CV statistic are averages over locations or years where specific statistical analyses were not run on the combined data or are from data obtained from only one replication or are 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 2017-2018 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 2008-2018.

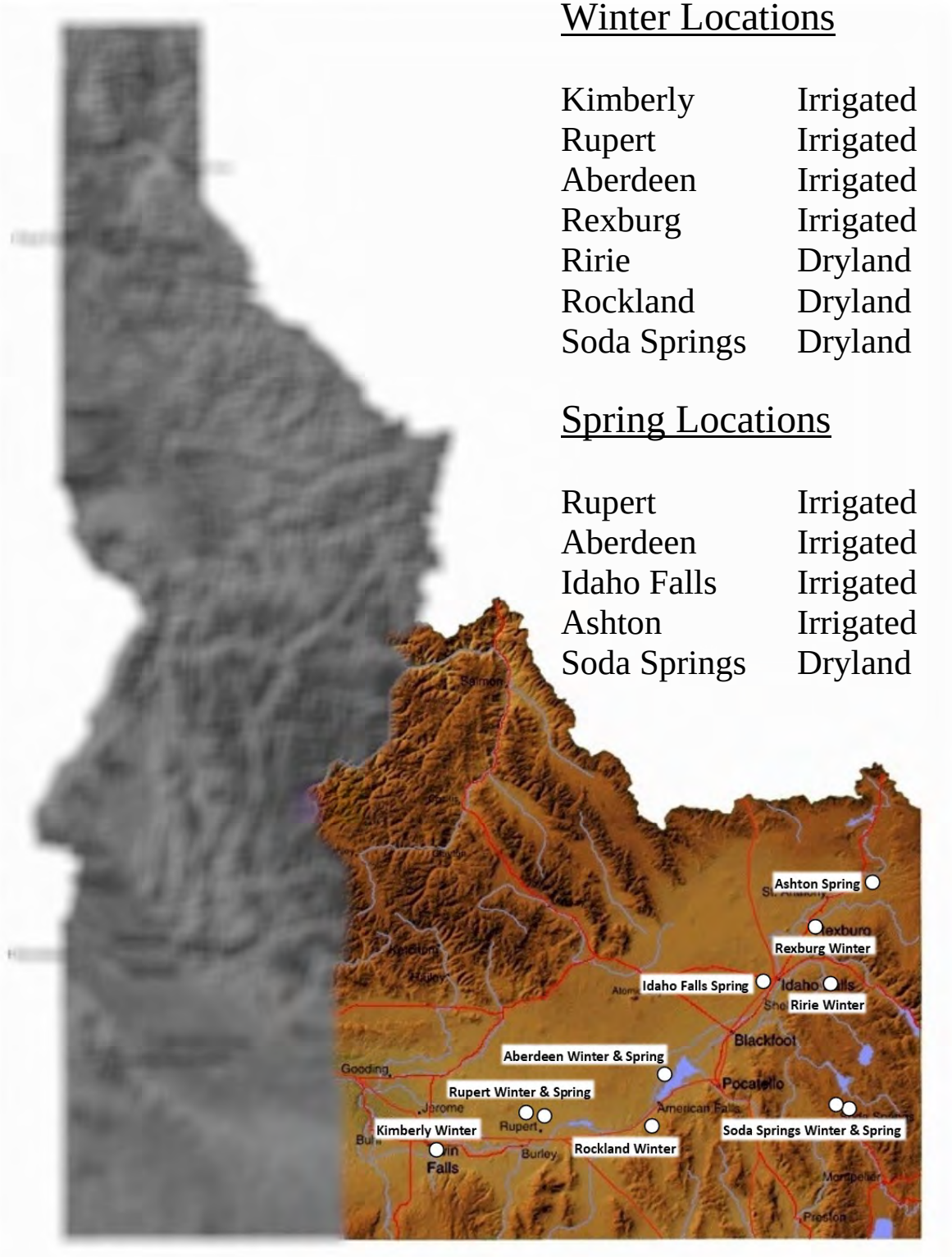
Southcentral & Southeast Idaho Cereal Variety Trial Locations

Winter Locations

Kimberly	Irrigated
Rupert	Irrigated
Aberdeen	Irrigated
Rexburg	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°33'4.86"N, 114°20'31.40"W
Elevation: 3897 ft.
Soil Type: #10 Bahem silt loam, 1-4% slopes
Previous Crop: Dry beans
Planting Date: October 6, 2017
Harvest Date: July 30 & 31, 2018
Chemicals applied: Talinor 10.2 oz/A, CoAct+ 3 oz/A, Starane Ultra ½ pt/A, Axial XL 1 pt/A, Huskie 15 oz/A

Fertility:

	Organic matter	pH	Free Lime %	Hard winter wheat N#/A	Soft white winter wheat N #/A	P	K	S
12" soil test results (N & S= 0-24")	1.4	8.2	11.6	240	240	9 ppm	190 ppm	
Fertilizer applied (lbs/A)				80	40	180#	50#	50#
Total	**1.4**	**8.2**	**11.6**	**320**	**280**	**9+ ppm**	**190+ ppm**	

Rupert Winter Irrigated:

Cooperator: Luke Adams
Located at approximately 300 W. 900 N. Rupert, Idaho

Coordinates: 42°44'57.81"N, 113°43'27.79"W
Elevation: 4268 ft.
Soil Type: #24 Portneuf silt loam, 1-4% slopes
Previous Crop: Sugar Beets
Planting Date: September 29, 2017
Harvest Dates: July 25 & 26, 2018
Chemicals applied: Starane Ultra 6 oz/A, Brox-M 1 pt/A, Axial XL 1 pt/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")	1.4	7.8	4.8	130	130	27 ppm	282 ppm	49 ppm
Fertilizer applied (lbs/A)				190	150	85#		88#
Total	**1.4**	**7.8**	**4.8**	**320**	**280**	**27+ppm**	**282 ppm**	**49+ppm**

Location Descriptions

Aberdeen Winter Irrigated:

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

Coordinates: 42°57'48.58"N, 112°49'15.39"W
Elevation: 4404 ft.
Soil Type: DeA Declo loam, 0-2%slopes
Previous Crop: Green Manure Oats
Planting Date: September 27, 2017
Harvest Dates: August 2-3 & 6-7, 2018
Chemicals applied: Brox-M 1 pt/A, Starane Ultra 8 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")	1.4	8.1	9.1	156	156	23 ppm	210 ppm	59 ppm
Fertilizer applied (lbs/A)				259	150	50#	20#	50#
Total	**1.4**	**8.1**	**9.1**	**415**	**306**	**23+ppm**	**210+ ppm**	**59+ppm**

Rexburg Winter Irrigated:

Brigham Young University-Idaho, Chris Humphreys
Corner of University Blvd and 2nd West, Rexburg, ID

Coordinates: 43°48'21.04"N, 111°47'25.67"W
Elevation: 4969 ft.
Soil Type: #32 Pocatello variant silt loam, 4-8% slopes
Previous Crop: Barley
Planting Date: October 2, 2017
Harvest Dates: August 7, 2018
Chemicals applied: Axial Star 16.4 oz/A, Affinity Broadspec 10 oz/A, Interlock 5 oz/A

Fertility:

	Organic Matter	pH	Free Lime %	Hard winter wheat N#/A	Soft white winter wheat & winter barley N #/A	P	K	S
Fertilizer applied (lbs/A)				320	270		10#	10#

Location Descriptions

Ririe Winter Dryland:

Cooperator: Trevor Davey
Approximately 1.7 miles south of Ririe Reservoir Dam on Meadow Creek Rd Ririe, ID

Coordinates: 43°33'51.99"N, 111°43'22.60"W
Elevation: 5460 ft.
Soil Type: #42 Ririe silt loam, 4-12% slopes
Previous Crop: Fallow
Planting Date: October 3, 2017
Harvest Date: August 8 & 9, 2018
Chemicals applied: 16 oz/A Goldsky, 9 oz/A LV6, .5 oz/A Powerflex

Fertility:

	Organic Matter	pH	Free Lime %	Hard winter wheat N#/A	Soft white winter wheat N #/A	P	K	S
12" soil test results (N & S= 0-24")	1.1	7.8	<1.0	69	69	19 ppm	428 ppm	16 ppm
Fertilizer applied (lbs/A)				12	12	30 #		
Total	**1.1**	**7.8**	**<1.0**	**81**	**81**	**19+ppm**	**428 ppm**	**16 ppm**

Rockland Winter Dryland:

Cooperators: Gilbert and Carl Hofmeister
3/4 mile west of Rock Creek Rd on Deeg Rd Rockland, ID

Coordinates: 42°39'44.96"N, 112°56'33.61"W
Elevation: 4617 ft.
Soil Type: #51 Newdale silt loam, 4-12% slopes
Previous Crop: Fallow
Planting Date: September 27, 2017
Harvest Date: July 26, 2018
Chemicals applied: Powerflex HL 2 oz/A

Fertility:

	Organic Matter	pH	Free Lime %	Winter wheat N#/A	P	K	S
Fertilizer applied (lbs/A)				50			20

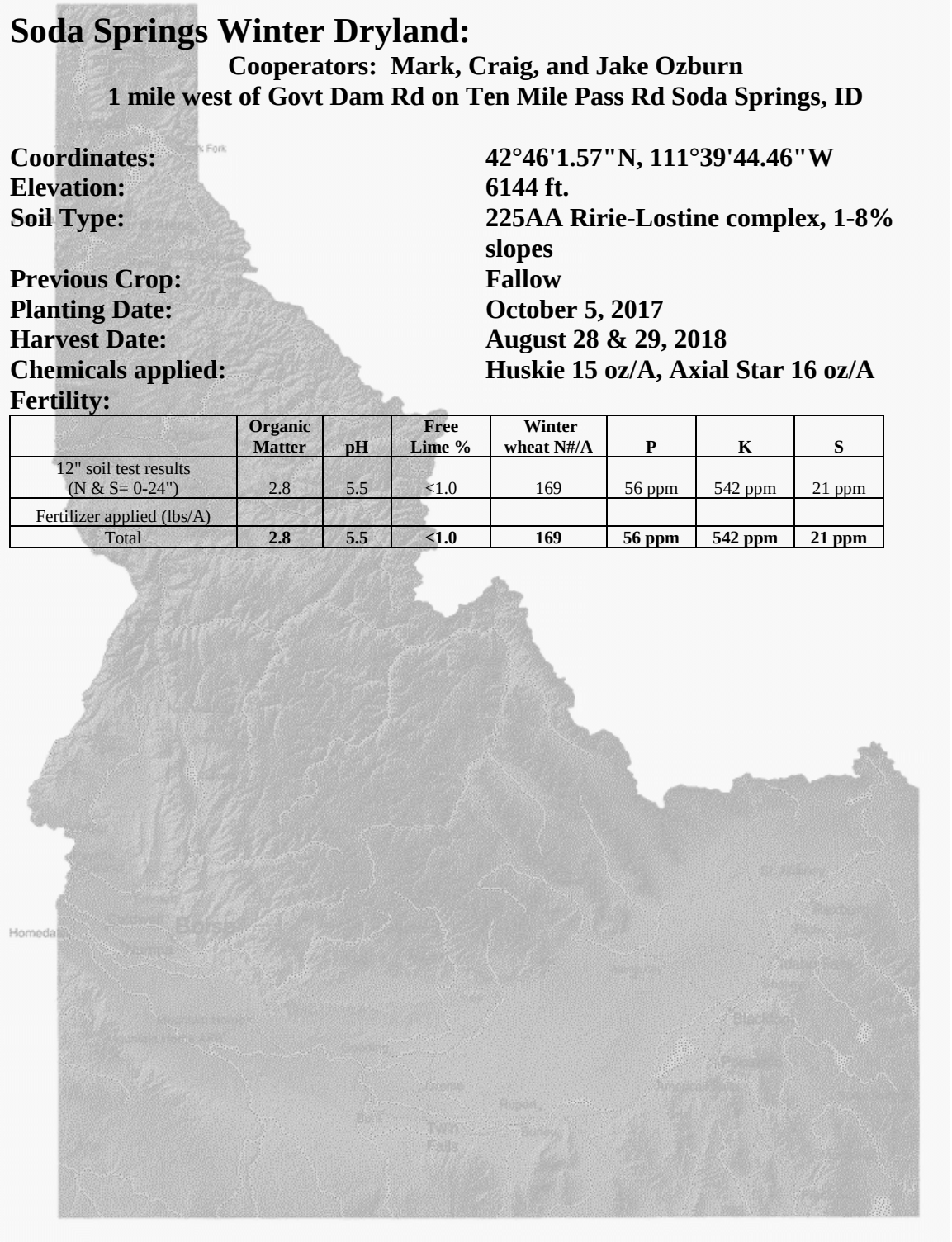
Location Descriptions

Soda Springs Winter Dryland:

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

Coordinates: 42°46'1.57"N, 111°39'44.46"W
Elevation: 6144 ft.
Soil Type: 225AA Ririe-Lostine complex, 1-8% slopes
Previous Crop: Fallow
Planting Date: October 5, 2017
Harvest Date: August 28 & 29, 2018
Chemicals applied: Huskie 15 oz/A, Axial Star 16 oz/A
Fertility:

	Organic Matter	pH	Free Lime %	Winter wheat N#/A	P	K	S
12" soil test results (N & S= 0-24")	2.8	5.5	<1.0	169	56 ppm	542 ppm	21 ppm
Fertilizer applied (lbs/A)							
Total	**2.8**	**5.5**	**<1.0**	**169**	**56 ppm**	**542 ppm**	**21 ppm**



Location Descriptions

Rupert Spring Irrigated:

Cooperator: Grant 4-D Farms
Approximately 500 E. 700N. Rupert, ID

Coordinates: 42°43'18.50"N, 113°34'11.79"W
Elevation: 4202 ft.
Soil Type: #23 Portneuf silt loam, 0-1% slopes
Previous Crop: Sugar Beets
Planting Date: April 10, 2018
Harvest Dates: August 20, 2018
Chemicals applied: Brox-M 1 pt/A, Starane Ultra 6 oz/A, Axial XL 1 pt/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	7.5	1.6	89	89	30 ppm	282 ppm	40 ppm
Fertilizer applied (lbs/A)				276	170	60#		
Total	**1.2**	**7.5**	**1.6**	**365**	**259**	**30+ppm**	**282 ppm**	**40 ppm**

Aberdeen Spring Irrigated:

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

Coordinates: 42°57'22.29"N, 112°49'28.84"W
Elevation: 4402 ft.
Soil Type: DeA Declo loam, 0-2% slopes
Previous Crop: Green Manure Oats
Planting Date: April 9, 2018
Harvest Date: August 13-15, 2018
Chemicals applied: Brox-M 1 pt/A, Starane Ultra 6 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	6.1	156	156	25 ppm	260 ppm	44 ppm
Fertilizer applied (lbs/A)				259	150	20#	20#	100# S, 20# SO_4
Total	**0.9**	**8.1**	**6.1**	**415**	**306**	**25+ppm**	**260+ ppm**	**44+ppm**

Location Descriptions

Idaho Falls Spring Irrigated:

Cooperator: Marc Thiel
Approximately 2350 S. on 45th West Idaho Falls, ID

Coordinates: 43°28'43.31"N, 112° 7'24.15"W
Elevation: 4684 ft.
Soil Type: #22 Pancheri silt loam, 0-2% slopes
Previous Crop: Alfalfa
Planting Date: April 17, 2018
Harvest Date: August 16, 2018
Chemicals applied: Huskie 15 oz/A, AgriStar D-638 4 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")	1.6	8.0	14.2	101	101	25 ppm	195 ppm	61 ppm
Fertilizer applied (lbs/A)				190	150	30#		
Total	**1.6**	**8.0**	**14.2**	**291**	**251**	**25+ppm**	**195 ppm**	**61 ppm**

Ashton Spring Irrigated:

Cooperator: Alan Baum
Approximately 3850 E. 1350 N. Ashton, ID

Coordinates: 44°4'40.55"N, 111°23'9.08"W
Elevation: 5397 ft.
Soil Type: #24 Greentimber – Marystown – Robinlee silt loams, 1-4% slopes
Previous Crop: Potatoes
Planting Date: April 27, 2018
Harvest Date: September 5, 2018
Chemical applied: Huskie 15 oz/A, Axial Star 16 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")	1.9	6.5	<1.0	86	86	14 ppm	146 ppm	35 ppm
Fertilizer applied (lbs/A)				180	140			
Total	**1.9**	**6.5**	**<1.0**	**266**	**226**	**14 ppm**	**146 ppm**	**35 ppm**

Location Descriptions

Soda Springs Spring Dryland:

Cooperators: Kyle Wangemann and Scott Brown
1/10 mile west of DeKay Rd on Meadowville Rd, Soda Springs, ID

Coordinates: 42°44'55.72"N, 111°36'23.94"W
Elevation: 6000 ft.
Soil Type: 485AA - Foundem-Rexburg complex, cool, 1-4% slopes
Previous Crop: Spring Barley
Planting Date: May 3, 2018
Harvest Date: August 29, 2018
Chemicals applied: Huskie 15 oz/A, Axial Star 16 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")	2.6	6.5	<1.0	140	140	34 ppm	409 ppm	19 ppm
Fertilizer applied (lbs/A)								
Total	**2.6**	**6.5**	**<1.0**	**140**	**140**	**34 ppm**	**409 ppm**	**19 ppm**

Temperature and irrigation/precipitation totals for all locations, recorded with on-site weather stations provided with financial support from the Idaho Wheat Commission.

Variety Trial Site	Dates of station recording range	Maximum temperature °F	Minimum temperature °F	# of days above 90°F	# of days below 50°F	# of days below 40°F	Spring & Summer Precipitation and Irrigation
Kimberly	May 18 - July 31, 2018	105.0	36.7	25	38	4	18.53
Rupert winter	May 18 - August 20, 2018	104.3	31.0	23	55	9	14.89
Ririe	May 27 - August 8, 2018	99.7	30.3	31	44	6	2.83
Rockland	May 24 - July 26, 2018	103.5	30.6	26	34	7	1.19
Soda Springs winter	June 6 - August 29, 2018	103.4	24.3	39	81	33	1.96
Rupert spring	May 29 - August 20, 2018	110.7	33.9	39	34	7	10.4
Idaho Falls	May 25 - August 16, 2018	106.6	30.1	31	73	8	12.32
Ashton	June 7 - September 5, 2018	99.6	30.1	10	76	9	2.68
Soda Springs spring	June 8 - August 29, 2018	102.5	23.3	36	79	48	1.55

Table 1. Released varieties tested in 2017-2018 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						
Brundage	ID86-14502B	34	13,540	74	1996	Idaho AES
Bruneau	ID93-64901A	35	13,148	76	2009	Idaho AES
Eltan	WA7431	33	13,745	73	1990	Washington AES, USDA
Jasper	WA 8169	29	15,641	64	2015	Washington AES, USDA
LCS Artdeco	NSA06-2153A	42	10,800	93	2011	Limagrain Cereal Seeds, LLC
LCS Drive	LWW12-7105	38	12,096	83	2015	Limagrain Cereal Seeds, LLC
LCS Hulk	LWW14-73163	41	11,200	89	2018	Limagrain Cereal Seeds, LLC
LCS Shark	LWW14-71195	50	9,164	109	2018	Limagrain Cereal Seeds, LLC
Norwest Duet	LOR-092	32	14,400	69	2015	OSU /Limagrain Cereal Seeds, LLC
Norwest Tandem	LOR-334	29	15,641	64	2016	OSU /Limagrain Cereal Seeds, LLC
Otto	WA008092	34	13,540	74	2011	Washington AES, USDA
Rosalyn	OR2071071	41	11,200	89	2013	Oregon AES, USDA
Stephens	OR65-116	41	11,063	90	1977	Oregon AES, USDA
SY Assure	04PN096-2	38	12,096	83	2016	Syngenta Cereals
SY Banks	09PN005#25	39	11,782	85	2017	Syngenta Cereals
SY Command	04PN066-7	35	12,960	77	2017	Syngenta Cereals
SY Dayton	09PN062#18	38	12,096	83	2017	Syngenta Cereals
SY Ovation	03PN108#21	40	11,484	87	2011	Syngenta Cereals
UI Castle CL+	IDN 09-DH10	32	14,400	69	2015	Idaho AES / Limagrain Cereal Seeds
UI Magic CL+	IDN 09-DH11	39	11,631	86	2015	Idaho AES / Limagrain Cereal Seeds
UI Sparrow	IDO1108DH	37	12,259	82	2016	Idaho AES
WB 456	BU6W99-456	35	13,148	76	2009	Bayer Crop Science / WestBred
WB1376CLP	WB-1030CL	40	11,484	87	2014	Bayer Crop Science / WestBred
WB1529	BZ6W07-436	47	9,651	104	2013	Bayer Crop Science / WestBred
WB1604	BZ6W07-458	42	10,930	91	2013	Bayer Crop Science / WestBred
WB1783	BZ6W09-471	44	10,309	97	2016	Bayer Crop Science / WestBred
Hard Red and White (W) Winter Wheat						
AAC Wildfire	W512	44	10,428	96	2018	AAFC Lethbridge / SeCan
Bearpaw	MTS0721	31	14,872	67	2011	Montana AES
Curlew	UT9325-55	34	13,341	75	2009	Utah AES, USDA
Deloris	UT2030-32	37	12,259	82	2002	Utah AES, USDA
Golden Spike (W)	UT1944-158	37	12,259	82	1999	Utah AES, USDA
Greenville	UT9743-42	39	11,782	85	2011	Utah AES, USDA
Irv (W)	OR2110679	43	10,673	94	2018	Oregon State AES
Juniper	IDO 575	42	10,930	91	2005	Idaho AES, USDA
Keldin	ACS55017	52	8,808	114	2011	Bayer Crop Science / WestBred
LCS Jet	NSA 7208	46	9,861	101	2015	Limagrain Cereal Seeds, LLC
LCS Rocket	NSA10-2196	46	9,969	100	2018	Limagrain Cereal Seeds, LLC
LCS Yeti (W)	LCI13DH-2222	42	10,930	91	2018	Limagrain Cereal Seeds, LLC
Loma	MTS1224	30	15,376	65	2016	Montana AES
Lucin-CL	UT10322	36	12,777	78	2011	Utah AES, USDA
Mandala		42	10,800	93		Tri State Seed
Metropolis		42	10,800	93	2016	Tri State Seed
Northern	MT0978	37	12,259	82	2015	Montana AES
Norwest 553	ORN00B553	25	18,514	54	2007	Oregon State AES, USDA-ARS, Limagrain U.K.
Promontory	UT1567-51	33	13,745	73	1990	Utah AES, USDA
Rebelde		30	15,120	66	2012	Tri State Seed
Sequoia	WA8180	37	12,427	80	2015	Washington AES, USDA
SY Clearstone 2CL	MTCL1077	41	11,063	90	2012	Syngenta Cereals
SY Touchstone (W)	04PN028B-3	37	12,427	80	2016	Syngenta Cereals
UI Silver (W)	IDO658B	31	14,632	68	2011	Idaho AES, USDA
UI SRG	IDO656	42	10,930	91	2012	Idaho AES, USDA
UICF-Grace (W)	IDO651	40	11,484	87	2009	Idaho AES, USDA
Utah 100	UT1650-150	40	11,484	87	1997	Utah AES, USDA
Warhorse	MTS0808	34	13,341	75	2013	Montana AES
WB4269	H4N12-0038	32	14,175	71	2016	Bayer Crop Science / WestBred
WB4311	XA4104	43	10,673	94	2017	Bayer Crop Science / WestBred
WB4418	XA4402	34	13,540	74	2017	Bayer Crop Science / WestBred
WB4623CLP	BZ9WM09-1663	36	12,777	78	2014	Bayer Crop Science / WestBred
Whetstone	W98-344	36	12,777	78	2009	Syngenta Cereals
Yellowstone	MT00159	41	11,200	89	2005	Montana AES

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

Table 1 (cont'd). Released varieties tested in 2017-2018 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	34	13,341	75	2002	Idaho AES, USDA
Louise	WA7921	40	11,340	88	2004	Washington AES, USDA
Melba (club wheat)	WA8193	42	10,800	93	2016	Washington AES, USDA
Ryan	WA8214	49	9,257	108	2016	Washington AES, USDA
Seahawk	WA8162	42	10,800	93	2015	Washington AES, USDA
SY Saltese	SY3024-2	41	11,063	90	2016	Syngenta Cereals
Tekoa	WA8189	44	10,309	97	2016	Washington AES, USDA
UI Pettit	IDO632	32	14,175	71	2006	Idaho AES, USDA
UI Stone	IDO599	34	13,341	75	2012	Idaho AES / Limagrain Cereal Seeds
WB6121	BZ608-121	34	13,341	75	2013	Bayer Crop Science / WestBred
WB6341	BZ608-014	35	12,960	77	2013	Bayer Crop Science / WestBred
WB6430	BZ608-125	37	12,259	82	2013	Bayer Crop Science / WestBred
Hard Red Spring Wheat						
Alum	WA8166	41	11,063	90	2015	Washington AES, USDA
Cabernet	95WV10616	34	13,341	75	2007	Syngenta Cereals
Choteau					2003	Montana AES
Duclair					2011	Montana AES
Glee	WA8074	46	9,861	101	2012	Washington AES, USDA
Jefferson	IDO462	38	11,937	84	1998	Idaho AES, USDA
LCS Iron	11SB0096	37	12,259	82	2015	Limagrain Cereal Seeds, LLC
LCS Luna	10SB0087-B	35	12,960	77	2017	Limagrain Cereal Seeds, LLC
NS Presser CLP		30	15,120	66	2018	Northern Seeds
SY Coho	04W40292R	43	10,549	95	2015	Syngenta Seeds, Inc
SY Gunsight	06PN3015-08	35	12,960	77	2016	Syngenta Seeds, Inc
SY Renegade	06PN3017-09	39	11,631	86	2018	Syngenta Seeds, Inc
WB9411	BZ908-418	34	13,341	75	2015	Bayer Crop Science / WestBred
WB9433	XA9503	40	11,340	88	2017	Bayer Crop Science / WestBred
WB9578	Y9A12-0004	42	10,800	93	2016	Bayer Crop Science / WestBred
WB9590	F9N12-0151	36	12,600	79	2016	Bayer Crop Science / WestBred
WB9668	BZ908-552	34	13,341	75	2013	Bayer Crop Science / WestBred
Hard White Spring Wheat						
Dayn	WA8123	48	9,450	106	2012	Washington AES, USDA
Klasic	NK77S1817	41	11,063	90	1982	Northrup-King Co., Minneapolis, MN
SY Teton	SY10136	33	13,745	73	2015	Syngenta Seeds, Inc
UI Platinum	IDO694C	39	11,631	86	2014	Idaho AES, Limagrain Cereal Seeds
WB7202CLP	XA7320	33	13,745	73	2017	Bayer Crop Science / WestBred
WB7328	BZ9S09-0133W	42	10,800	93	2014	Bayer Crop Science / WestBred
WB7589	BZ9S09-0735W	47	9,651	104	2014	Bayer Crop Science / WestBred
Spring Durum Wheat						
Alzada	YU894-75	48	9,450	106	2003	Bayer Crop Science / WestBred
Imperial	PH833-15	40	11,340	88	1987	Bayer Crop Science / WestBred
Winter Barley - malt						
Charles	94Ab1274	50	9,072	110	2005	USDA-ARS, Aberdeen
Delicatesse		51	8,982	111	2016	Secobra Recherches
Endeavor	95Ab2299	49	9,353	107	2008	Idaho AES, USDA
Etincel		45	10,080	79	2016	Secobra Recherches
KWS Scala	GW2895	53	8,558	93	2012	KWS Cereals
KWS Sommerset	GW3479	55	8,323	96	2017	KWS Cereals
LCS Calypso		50	9,164	87	2017	Limagrain Cereal Seeds, LLC
Madness		49	9,353	86	2016	Secobra Recherches
Maltesse		55	8,247	97	2016	Secobra Recherches
Rubinesse		38	11,937	67	2016	Secobra Recherches
Thunder	10.0777	52	8,808	91	2016	Oregon AES, USDA
Voyel		43	10,549	76	2016	Secobra Recherches
Wintmalt		52	8,808	91	2014	Oregon AES, USDA
Winter Barley - feed and food						
Buck[2]	09-OR-86	37	12,259	82	2014	Oregon AES, USDA
Eight-Twelve	79Ab812	36	12,600	79	1988	Idaho AES, USDA
Sunstar Pride	SDM204-B	31	14,872	54	1995	Sunderman Breeding, Twin Falls, ID
Upspring[2]	05ARS748-260				2018	Idaho AES, USDA

[1]Adjusted 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.

[2] Hulless

Table 1 (cont'd). Released varieties tested in 2018 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
	Two-Row Spring Barley						
feed	Altorado	BZ509-601	44	10,309	78	2016	Highland Specialty Grains
feed	Champion	YU501-385	52	8,723	92	2007	Highland Specialty Grains
feed	Claymore	BZ509-216	43	10,549	76	2015	Highland Specialty Grains
feed	Idagold II	C32	46	9,861	81	2002	Coors Brewing Co. Inc., Burley, ID
feed	Lenetah	01Ab11107	49	9,257	86	2008	Idaho AES, USDA
feed	Millennium (6R)	UT004603	38	11,937	67	2000	Utah AES, USDA
feed	Oreana	BZ509-448	42	10,800	74	2015	Highland Specialty Grains
feed	Xena	BZ594-19	45	10,080	79	2000	Highland Specialty Grains
food	Goldenhart	2Ab09-X06F058HL-31	43	10,549	76	2018	Idaho AES, USDA
food	Julie[2]	03AH6561-94	46	9,861	81	2010	Idaho AES, USDA
food	Kardia	2Ab09-X06F084-51	45	10,080	79	2016	Idaho AES, USDA
food	Transit[2]	03AH3054-51	48	9,450	85	2010	Idaho AES, USDA
malt	AAC Connect	TR04282	51	8,894	90	2016	Agriculture Canada / Canterra Seeds
malt	AAC Synergy	TR09208	45	10,080	79	2015	Agriculture Canada / Syngenta
malt	ABI Eagle	2B11-4949	42	10,800	74	2019	Busch Agricultural Resources, LLC, Ft. Collins, CO
malt	ABI Growler	2B09-3425	45	10,080	79	2015	Busch Agricultural Resources, LLC, Ft. Collins, CO
malt	ABI Voyager	B3719	44	10,309	78	2011	Busch Agricultural Resources, LLC, Ft. Collins, CO
malt	AC Metcalfe	TR232	46	9,861	81	1994	Agriculture Canada
malt	CDC Bow	TR11127	53	8,558	93	2017	CDC University of Saskatchewan/ SeCan
malt	CDC Copeland	TR150	43	10,549	76	1999	CDC University of Saskatchewan/ SeCan
malt	CDC Fraser	TR12135	52	8,723	92	2018	CDC University of Saskatchewan/ SeCan
malt	Conrad	B5057	46	9,861	81	2004	Busch Agricultural Resources, LLC, Ft. Collins, CO
malt	Esma		50	9,072	88		Ackermann Saatzucht GmbH & Co. KG
malt	Explorer		43	10,549	76		Secobra Recherches
malt	Full Pint	BCD-47	52	8,723	92	2014	Oregon State University
malt	GemCraft	2Ab08-X05M010-65	42	10,800	74	2018	USDA ARS, Idaho AES
malt	LCS Genie	NSL07-8424-A	40	11,340	71	2011	Limagrain Cereal Seeds, LLC
malt	LCS Odyssey	NSL08-4556-A	42	10,800	74	2015	Limagrain Cereal Seeds, LLC
malt	LCS Opera		50	9,072	88	2016	Limagrain Cereal Seeds, LLC
malt	LCS Sienna		49	9,257	86	2016	Limagrain Cereal Seeds, LLC
malt	Manta		50	9,072	88		Ackermann Saatzucht GmbH & Co. KG
malt	Merit 57	2B99-2657	39	11,631	69	2009	Busch Agricultural Resources, LLC, Ft. Collins, CO
malt	Moravian 69	C69	44	10,309	78	2005	Coors Brewing Co. Inc., Burley, ID
malt	Moravian 165		48	9,450	85	2017	Coors Brewing Co. Inc., Burley, ID
malt	Moravian 179		46	9,861	81	2018	Coors Brewing Co. Inc., Burley, ID
malt	Sangria		56	8,100	99		Ackermann Saatzucht GmbH & Co. KG
malt	SY Sirish		46	9,861	81	2016	Syngenta Cereals

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

[2] Hulless

RESULTS AND DISCUSSION

Planting Conditions

The fall of 2017 provided good conditions for planting winter grain on both irrigated and dryland ground. September precipitation exceeded 10-year and 104-year averages (see Chart 1), giving a decent start to the planting year, followed by a very dry fall and winter, and a relatively wet spring. The dryland conditions benefited from some September rains that improved the soil moisture prior to planting in eastern Idaho, but overall winter planting was a little later than average.

Spring planting conditions were good for stand establishment, and moisture in April was above average, resulting in excellent establishment and early growth. Planting at Ashton was delayed a little due to spring rain. Most locations were seeded at similar timings to the previous year.

Weather Conditions

Natural precipitation was above the 10-year and 104-year averages in November and March during the growing season, and below in May, June, July and August (Chart 1). An early frost contributed to lower aphid populations and the subsequent transmission of barley yellow dwarf virus was reduced. Early spring rains resulted in good growing conditions until irrigation was available after April.

Severe spring storms with multiple hail events severely damaged areas throughout southern and eastern Idaho. The precipitation in May through August were below average, but there was enough subsoil moisture to finish off the dryland winter crop and in some cases, the dryland spring crop.

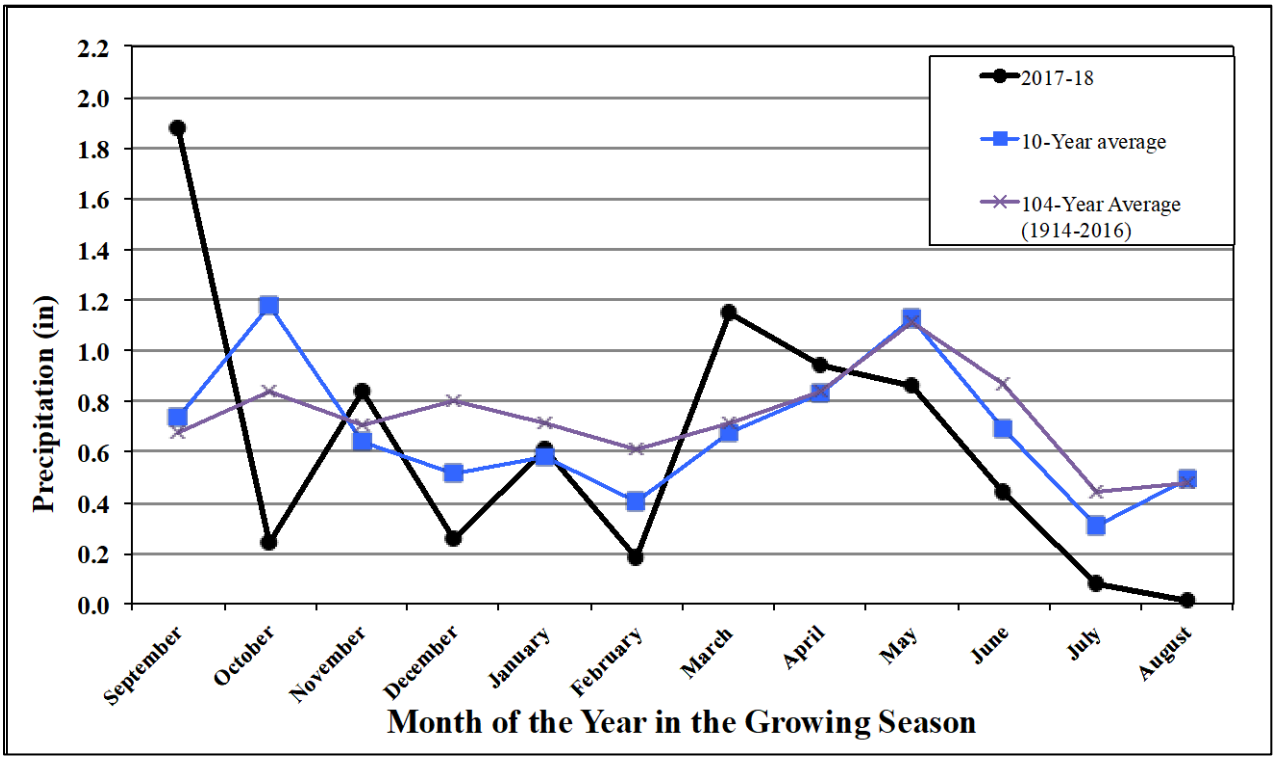


Chart 1. 2016-2017 growing year precipitation recorded at Aberdeen, ID, versus 10-year and 104-year averages. Source: NWS & Agrimet data.

A more moderate weather pattern was established in late May and continued into June with temperatures being similar to the historical average, but July was hotter than average. Heading dates for winter wheat nurseries were four days earlier than the average of the previous ten years (Table 3). Spring wheat heading dates were eight days earlier than previous ten-year average, and spring barley was four days earlier. Plant heights were close to average for winter and spring crops. Lodging was also very low for all crops. Trial yields for winter and spring wheat were above average, and below average for spring barley. Test weights were above average for winter wheat, and at 10-year averages for spring wheat and barley.

While grower yields were considered average throughout the area, crop quality was considered excellent.

Disease and Insect Problems

Overall, major insect and disease issues were limited to wireworms, stem sawfly, late-season stripe rust and Xanthomonas black chaff / bacterial leaf streak.

Bacterial leaf streak/Black Chaff (*Xanthomonas spp*)
Due to unusually severe spring storms in April through May, hail directly damaged winter and spring grain, resulting in bent and broken stems and heads. Due to extensive tissue damage from hail and sleet, bacterial infection easily developed in those open wounds. As Xanthomonas bacteria are fairly ubiquitous throughout our grain production areas, bacterial leaf streak and black chaff quickly develop first on the leaves, then on the heads of cereal crops. Infection often occurs earlier in the season facilitated by hail events, then develops rapidly as the temperature increases and is spread via irrigation. There is very little that can be done to prevent or reduce the disease as fungicides are completely ineffective on bacteria. Reducing frequency of irrigation and increasing amount of irrigation is supposed to reduce how fast the disease spreads. Clean seed is also supposed to reduce likelihood of transmission to additional fields; however, the bacteria are everywhere and hail events are unpredictable and uncontrollable. Effective measures to reduce the disease are often not practical or possible.

Wireworms (of various species) were damaging again in many areas across the entire region, reducing stand and yield of spring wheat and barley in dryland production. 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 to previous years, but in some areas damage was estimated at close to 40%. 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 2016-2018 seasons.

Volunteer grain continues to contribute to some green bridge conditions. Early planted winter wheat and barley suffered from **Barley Yellow Dwarf (BYD)** and **Wheat Streak Mosaic Virus (WSMV)** infections, but many have the equipment necessary to avoid having to plant too early to get all their acreage planted. Stripe rust did not

appear to infect susceptible varieties of fall-planted wheat, preventing carryover.

Stripe rust (*Puccinia striiformis* f.sp. *tritici*) did not overwinter near the Oregon – Idaho border, but was found in Brundage soft white winter wheat and in susceptible spring wheat varieties much later in the season. Susceptible spring wheat became severely infected late in the season, resulting in 20-25% yield loss compared to fungicide treated plots. Actively scouting fields of susceptible varieties is highly 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. Two-rowed barleys tend to have greater levels of resistance to stripe rust than do the six-rowed varieties, but no barley stripe rust was found in 2018.

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 which then may affect early development in spring barley. Barley scald will also increase in minimum and no-till situations where the fungus may reside in residue.

Strawbreaker foot rot (formerly *Pseudocercosporella herpotrichoides*) is usually a stem-based disease in winter wheat and barley, but in some years, like the 2017 spring, can be found in spring wheat and barley. Strawbreaker was less of an issue in 2018 cereal crops. Infection occurs from residue-borne fungi when there is excess moisture, humidity and cool temperatures through the winter and spring. Characteristic elliptical lesions form at the lower nodes of the stem, weakening the tiller and increasing lodging. This disease is exacerbated by rainy spring conditions and successive years of grain production. High rates of nitrogen also promote the disease, especially when applied alone without other 'balancing' nutrients. The most effective means of reducing this disease is through crop rotation. However, if detected early in the spring, this disease is reduced with the application of benomyl fungicides like Benlate, Topsin M, or Mertect.

***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 to eliminate volunteer grain in the fall prior to winter setting in, or at least two to *three* weeks prior to spring sowing. Later planting reduces spring yield and quality, but substantial and greater yield reductions occur with soil-borne diseases in grain following grain. Diseases that spread from dying grain can cause a great deal of damage to the developing roots and seedlings of the newly planted crop, reducing tillering, water and nutrient uptake.

Luckily, growing conditions in 2018 were not conducive to widespread grain infections of **Fusarium head blight (FHB)** (also called Head Scab, causal organisms *Fusarium graminearum* and other *Fusarium* spp.). There were some localized problems in spring wheat and spring barley, especially

in fields planted in and near corn residue, but overall the environment was not conducive to widespread FHB infection. Unusually, some winter wheat was infected with FHB in eastern Idaho near Shelley. A significant problem in 2015, FHB 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. Spores formed on corn residue can travel many miles in the wind. 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 and many acres of spring barley in the Rupert production region. 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 6a for 2017 data of spring wheat reaction to FHB infection, and Addendum 6b for spring barley.)

The **"Spot Form of Net Blotch**" (SFNB) of barley *Pyrenophora teres* f.sp. *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 from 2016 through 2018. 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.

Green Bridge, 2017 to 2018.
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 (as in 2010) winter wheat stay green and growing even after harvest; 2) windy conditions causes shattering of spring grains (as 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 that 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 green bridge 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 green bridge situation resulted in extensive BYD and stripe rust infection in the fall volunteer. Once again, in the fall of 2014, 2015 and 2016, high populations of aphids moved into the earliest emerging winter wheat and barley, contributing to a widespread occurrence of BYD 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) move from corn to winter cereals, landing on the newly emerged grain and transmitting the virus to the new crop. Aphid populations may build up before a killing frost occurs. Severe stunting and yellowing of grain in the spring becomes apparent, resulting in yield reductions of over 50% in the most severely affected fields. However, in the spring of 2017 and 2018, lower levels of fall transmission occurred due to delayed fall planting and use of insecticidal seed treatments and excellent growing conditions, preventing widespread losses from BYD.

2018 Report: Discussion of Location Conditions and Results

It is best to consider three year or multiple year, multiple site averages when choosing varieties for your specific location. Conditions vary tremendously from year to year, and one-year results can often be misleading. Yield stability and disease reactions often require many years and/or locations of evaluations. While the multiple location/three-year average data presented in the Tables provide more accurate information, new varieties will have limited performance information, which may not be a good reflection of long-term performance.

Winter Wheat Averaged Data

Three-year averages of hard winter wheat over all irrigated locations (Table 4) put LCS Jet, Keldin, Yellowstone and Northern at the top with 148, 143, 142 and 137 bu/A, respectively. **Averaged over all 2018 irrigated locations**, the highest yielding **hard winter wheat** varieties in 2018 (Table 6) were Keldin (157 bu/A), Yellowstone (154 bu/A), LCS Jet (153 bu/A) and Northern (152 bu/A). The hard white winter wheat Irv yield of 141 bu/A was significantly different (less) from the advanced hard white line IDO1706, which yielded 161 bu/A.

Average 3-year dryland yields for hard red and white winter (Table 5) were 51 bu/A, where the top yielding varieties included Yellowstone (58 bu/A), SY Clearstone 2CL (W) (57 bu/A), LCS Jet (56 bu/A), and Keldin (also 56 bu/A). **2018 combined dryland yields** for **hard** red and white **winter wheat** (Table 7) averaged 51 bu/A, with the highest yielding varieties at 60 bu/A (WB4418), 59 bu/A (LCS Jet), 58 bu/A (Keldin with in furrow 11-52-0) and 57 bu/A (Yellowstone).

In several tables **Keldin (QC)** was added for "Quality Control", an internal measure of trial variability. All QC entries are a duplicate and technically should be exactly like the other same entry. Ideally, the duplicate entries will be very close in yield and within the LSD for the trial. Under irrigation in 2018 (Table 6), Keldin QC

yield was 157.3 bu/A, and Keldin was 149.4 bu/A, a difference of 7.9 bu/A. While that may seem significant, the LSD for the trial is 9.8, indicating that differences of less than 9.8 are not statistically significantly different, and fall within the margin of error. In Table 7, under dryland conditions, Keldin QC and Keldin were separated by 1.2 bu/A, well within the LSD of 5.2 bu/A.

Keldin + 11-52-0 – In-furrow fertilizer was added to one variety in the hard winter group to test the effect of starter fertilizer on yield. (Monoammonium phosphate or 11-52-0 at 20 lbs phosphate per acre was included in-furrow.) In Table 7, Keldin and Keldin +11-52-0 were within 2 bushels of each other, and very similar in other agronomic traits, indicating no effect of starter fertilizer on yield, etc. Under dryland conditions, Keldin + 11-52-0 was 3.1 bu/A greater than Keldin, but with the LSD of 5.2 bu/A, there is no statistically significant difference between the two for yield.

The top yielding **soft white winter varieties over the last three years** over all **irrigated** locations (Table 16) are WB1783 (144 bu/A), Bruneau (140 bu/A), SY Ovation (140 bu/A), Bobtail (138 bu/A), and WB1529 (135 bu/A). UI Sparrow, WB1783, SY Ovation, Bruneau, and SY Dayton were the top named varieties in the **combined irrigated trials in 2018** at 155, 154, 151 and 151 bu/A, respectively (Table 18).

Average 3-year dryland yields for soft white winter were 56.4 bu/A, where the top yielding varieties included WB1783 (64 bu/A), UI Sparrow (63 bu/A, LCS Hulk (61 bu/A), Otto (61 bu/A), and Bruneau (61 bu/A) (Table 17). 2018 combined dryland yields (Table 19) averaged 57 bu/A, with the highest yielding varieties at 68 bu/A (Bruneau and Eltan), 67 bu/A (WB1783), 64 bu/A (WB1529) and 63 bu/A (UI Sparrow). For an explanation of "UI Sparrow QC", see the above discussion on Keldin QC starting on page 20.

Winter Barley Averaged Data

Three year, multiple location averages for winter barley is presented in Table 28. Top yielding released varieties include Thunder (161 bu/A), Sunstar Pride (154 bu/A) and Wintmalt (141 bu/A). There are both malt, feed and food lines in this table, with Buck and Upspring being hulless food lines with high test weight. For the **irrigated averages in 2018** (Table 29), the top yielding varieties are Delicatesse (193 bu/A), LCS Calypso (188 bu/A), Sunstar Pride (185 bu/A) and Maltesse (184 bu/A). Test weights were all above 50 lbs/bu and grain proteins below 11.5%, except for the hulless food barley.

Spring Wheat Averaged Data

Over **three years over all locations**, the highest yielding varieties under irrigation (Table 33) were Dayn (hard white spring wheat at 131 bu/A), SY Teton (hard white at 121 bu/A), SY Coho (120 bu/A), LCS Iron (117 bu/A). The average 3-year test weight was 62.2 lbs/bu, and the average grain protein was 14.1%. High protein lines were WB9668 (15.9%), Alum (14.9%), WB9411 (14.6%) and WB7328 (14.9%). The **2018 combined irrigated average** for hard spring wheat (Table 35) was 116 bu/A. Dayn (hard white spring) averaged 136 bu/A, SY Renegade 127 bu/A, and Klasic 126 bu/A, all with excellent test weight. High protein red lines were WB9668 (15.4%), WB9590 (14.8%) Alum (14.1%), WB9411 (14.3%) and the white WB7328 (14.5%).

There is only one **dryland location** for spring wheat (Soda Springs), three-year average data for which is in Table 34. Highest yielding hard spring varieties include Dayn (W) at 41 bu/A, Alum 38 bu/A, Jefferson and LCS Iron at 34 bu/A.

Three-year averages for soft white spring wheat over all locations (Table 42) put WB6430 at the high yield (123 bu/A), followed by SY Saltese (123 bu/A),

Seahawk (123 bu/A), UI Stone (122 bu/A) and Alturas (120 bu/A), which are not statistically different from each other. The **2018 combined irrigated average** for soft white spring wheat (Table 44) was 123 bu/A. Ryan yielded 132 bu/A, WB6430 129 bu/A, Seahawk 128 bu/A, and Alturas 126 bu/A. Test weight was 61 lbs/bu for the average, and grain protein 10.8%.

There is only one **dryland location** for soft white spring wheat (Soda Springs), three-year average data for which is in Table 43. Alturas was the highest yielding variety at 46 bu/A, followed by UI Stone 45 bu/A and WB6430 44 bu/A. Test weight average was below 60 lbs/bu, and protein was 10.8%.

Spring Barley Averaged Data

Spring malt varieties and feed/food lines are reported in separate tables.

Three-year averages for the malt varieties (Table 51) puts LCS Odyssey, LCS Genie, ABI Voyager and Moravian 69 at the top (142, 138, 137, and 134 bu/A, respectively), all with excellent test weight and protein. Taking a look at **combined irrigated averages** for 2018 (Table 52), Esma, Sangria, Manta, SY Sirish and Moravian 179 yielded 170, 159, 154, 150 and 150 bu/A, respectively, all with excellent test weight, protein and plumps.

For the feed and food varieties, over three years, Altorado, Oreana and Claymore were the highest yielding feed varieties (Table 59) at 147, 145 and 144 bu/A, respectively. Kardia was the highest yielding food barley, but has a yield advantage in that it is a hulled food line, whereas Julie, Transit and Goldenhart are hulless, as reflected in the very high test weight. In the **combined 2018 irrigated trials** (Table 60), the top yielding named varieties were Altorado (151 bu/A), Oreana (144 bu/A), the six-rowed Millennium (153 bu/A), and Champion (137 bu/A). Julie was the highest yielding food barley (123 bu/A).

Kimberly Research and Extension Center, Winter Grain

Winter wheat nurseries were planted late behind dry beans – and were planted into drier than optimal conditions. Fall rains were timely and precluded the need to irrigate the winter trial immediately following planting. Soils were well-prepared and soil moisture was adequate for fall germination. The crop suffered no winter damage and was planted late enough (October 6, 2017) to avoid BYDV infection. Stripe rust was not damaging. Soft white winter wheat yields were about 15 bu/A greater than 2017, and 17 bu/A less than 2016, while hard winter wheat yields were about 17 bu/A less than 2017 and 38 bu/A less than 2016. (This is reflective of the varieties entered into the trial more than grain class or agronomic practices.) Plots were harvested July 30th, and July 31st, similar to the 2016 and 2017 harvests. NASS reports that Idaho 2018 wheat yields at 92 bu/A over all categories (irrigated and dryland, winter and spring). Quality was reported as excellent.

The hard winter wheat group (Table 8) yield ranged from 92 to 142 bu/A. Utah 100, Keldin, and LCS Jet were the highest yielding varieties, yielding 134, 130 and 129 bu/A, respectively. The mixed planting of Norwest 553 and Yellowstone yielded 118 bu/A, 37 bu/A less than in 2017 of 155 bu/A, planted with the objective of having Yellowstone in place to protect against the winter tender Norwest 553. Planted alone, Norwest 553 spring stand was 94% and both yields were 121 bu/A. Planted together, spring stand was also 94%. In many years, Norwest 553 suffers extensive winter-kill. Planted in a dual mix, a grower could hedge bets between the winter hardiness of Yellowstone, the stripe rust resistance of

Norwest 553, while combining the high yield potential of both. In 2018, there was no advantage to the mixed planting. Site average for yield of the hard winter group was 119 bu/A, less than 2017 and to 2016. Test weight average was 63.1 lbs/bu, excellent for winter wheat, and grain protein average for the location was 10.5%, even with total N available at 320 lbs N/acre. Optimal grain protein for hard red winter wheat should be 12.5% or greater. The ratio of applied N to (average) bu/A yield was 2.7, below the 3.0 to 3.5 ratio needed for optimal protein in hard winter wheat.

In the soft white winter group (Table 20), 2018 irrigated yield varied from 92 to 150 bu/A with lower CV's for the location than in 2017. UI Sparrow (148 bu/A), Bruneau (142 bu/A), UI Sparrow (QC) (139 bu/A), WB1529 and LCS Hulk (both 137 bu/A) were the highest yielding varieties. Test weight averaged 61.1 lbs/bu, and grain protein average for the location was at 8.6%, lower than optimal even with a total of 280 lbs available N in the nursery (see site description on page 6). Average yield for soft white winter wheat nursery was 124 bu/A, which calculates to 2.3 lbs of nitrogen per bushel of yield.

Rupert, Luke Adams, Winter Grain

Plots were planted Sept 29th in silt loam soil following sugar beets into good soil moisture. Spring stands of the winter wheat nurseries were very good, without the damage that occurred in 2017 from excessive snow and freeze-thaw cycles. There were no visual symptoms of BYD occurring at this site. Plots were harvested July 25th and 26th.

Average yield for the hard winter wheat trial (Table 9) was 152 bu/A, 31 bu/A greater than 2017, and 69 bushels greater than 2016. Yield ranged from 131 (Rebelde) to 178 bu/A for Keldin. Test weight averaged 61.6 lbs/bu, and protein averaged 11.2%. The ratio of average yield to total N was 320 / 152.3 = 2.1, below the 3.0-3.5 recommended to obtain high protein hard red winter wheat. As a result, the proteins were lower than optimal with the trial average at 11.2%. Keldin, Yellowstone and LCS Jet were the highest yielding named lines at 178, 170 and 169 bu/A, respectively. Stripe rust did not significantly impact yield, and there was no lodging.

The soft white winter group (Table 21) ranged in yield from 132 to 164 bu/A. The highest yielding varieties were SY Dayton (164 bu/A), WB1529 (161 bu/A), LCS Artdeco (160 bu/A) and SY Ovation (159 bu/A). Test weights averaged 60.1 lbs/bu. The ratio of available and applied N (320 lbs N/A) to average bushel yield (148) was 2.2 lbs N/bu. As a result, the proteins were lower than optimal with the trial average at 9.2%. There was no lodging in the soft winter wheat nurseries.

Winter barley plots were plowed under in 2017 due to poor spring stands as a result of flooding and freeze-thaw cycles. 2018 plots averaged 147 bu/A (Table 30), with yields ranging from 113 (Charles) to 181 bu/A (Delicatesse). Delicatesse yield was substantially greater than Sunstar Pride (166 bu/A), LCS Calypso (164 bu/A) and Madness (163 bu/A), all of which, except Sunstar Pride, are European malt lines.

Aberdeen Research and Extension Center, Winter Grain

The winter trials in Aberdeen were planted September 27th in a Declo loam soil, and harvested August 2-3, and 6-7th. BYD and stripe rust were not observed in the winter grain. The preceding crop was green manure oats.

The winter barley at Aberdeen had extensive winter damage in 2017, but survived well this year, and average spring stands were at 76 - 95%, except for one winter hulless food line, Upspring, with spring stands only at 45%. Despite the low rate of survival, yield

for Upspring was 147 bu/A. Winter barley yields were as high as 230 bu/A with an overall average of 185 bu/A (Table 31), 66 bu/a greater than in 2017. High yielding varieties included LCS Calypso (212 bu/A), Delicatesse (206 bu/A), Sunstar Pride (204 bu/A), Maltesse (206 bu/A) and KWS Somerset (202 bu/A). Charles and Endeavor, two older winter malt varieties, yielded 163 and 165 bu/A, respectively, with spring stands at 90 and 93% stand, respectively). Test weight averaged 52.7 lbs/bu, with high amounts of lodging, and grain protein averaged 11.5%. The ratio of applied N to average bushel yield was 1.7 lbs N/bu (306 lbs N/185 bu/A).

The hard winter wheat survival (Table 10) averaged 94%. Overall yields were higher than 2017 by 16 bu/A and from 2016 by 66 bu/A, probably due to later planting to avoid BYD damage. Lodging averaged 12%. Stripe rust did not significantly impact yield. The highest yielding line was XB4542, an advanced hard red winter from the WestBred breeding program. The 50/50 mix of Norwest 553 and Yellowstone yielded 176 bu/A, while the high yielding named varieties included Yellowstone (177 bu/A), WB4418 (177 bu/A), Keldin (163 bu/A) and Utah 100 (177 bu/A). For an internal "Quality Control" (QC) Keldin was included twice as Keldin QC – from this as well as from the CV you can estimate the degree of variability of the test. The CV for this trial is low (6.8%) also indicated by the two separate entries of Keldin yielding closely at 177 and 174 bu/A. The LSD at 15.7 bu/A indicates that yield differences have to be greater than 15.7 bu/A to be considered statistically significantly different. Test weights were good at 60.1 lbs/bu for the overall average. There was relatively low lodging for such a high yielding trial. Grain protein averaged 12.5%. The ratio of applied N to average bushel yield was 2.5 lbs N/bu. Additional N is recommended for the upper yielding varieties to meet target protein of 12.5%.

The overall yield average in the Aberdeen soft white winter trial (Table 22) was 173 bu/A, 29 bu/A greater than 2017, ranging from the low of 146 bu/A (ORI2150061CL+) to a high of 200 bu/A (UIL15-72223. The highest yielding named varieties were WB1783 (197 bu/A), UI Magic (188 bu/A), UI Sparrow (185 bu/A), SY Dayton (183 bu/A) and SY Ovation (182 bu/A). The test weights averaged at 59.6 lbs/bu and the overall grain protein was at 10.1%. The ratio of applied N to average bushel yield was 1.8 lbs N/bu. There was relatively low lodging for such a high yielding trial.

Rexburg, BYU-Idaho, Irrigated Winter Wheat

A new location was added to increase the ability to train undergraduate students in research techniques. Plots were planted by UI Cereals personnel, maintained and harvested by BYU-ID faculty and students.

In the hard red and white winter wheat trial (table 11), the CV for yield was good (11%) but high for test weight, reflecting a high degree of variability for that measurement. There was no lodging, but very good grain protein, indicating that there is potential for increasing irrigation inputs for higher yield. The risk of increasing irrigation is the potential for higher lodging and lower grain protein, which averaged 13.9%. The yield ranged from 101 bu/A (Rebelde) to 159 bu/A (Northern). The yield of the 50/50 mix of Norwest 553/Yellowstone was 153 bu/A, not significantly different from Yellowstone alone, and not *statistically* better than Norwest 553 at 139 bu/A (LSD = 20.8). The other high yielding varieties at that location include Northern (at 159 bu/A mentioned above), Mandala at 152 bu/A and AAC Wildfire, Utah 100, Yellowstone and Loma all coming in at 149 bu/A.

In the soft winter wheat trial (table 23), the CVs for yield and test weight are high,

reflecting a higher degree of variability for that trial. There was no lodging, very low grain protein, indicating that there is potential for increasing inputs for higher yield and higher grain protein. The yields ranged from a low of 84 bu/A for LCS Artdeco, to a high of 147 bu/A for Jasper. UI Castle, SY Ovation, UI Magic and SY Dayton also had high yields at 146, 141, 138 and 135 bu/A. With an LSD of 30.2 bu/A, the first statistically significant differences are seen with the comparison of Jasper with OR2121086.

Ririe, LDS Church Farm, Trevor Davey, Winter Wheat

This is a high elevation location (5500 ft.) and is our main location to test grain for winter hardiness under dryland conditions. Soil moisture was very good down to two feet when grain was planted October 3rd. Grain was planted into heavy stubble resulting in persistent trouble with coulters cutting through trash, resulting in a very poor seedbed. Despite the irregularity in seeding and plugged openers, the trial did exceptionally well due to timely spring rain. For 2018, the spring stand for winter wheat (Tables 12 and 24) was relatively good, and yields were greater than the previous two years. The average of 50 bu/A for hard wheat was about 20 bu/A more than 2017, as was the soft winter wheat at 52 bu/A. The trials were harvested August 8-9th.

The hard winter wheat group (Table 12) had average yields of 50 bu/A, in comparison to 2017 at 31 bu/A, 2016 at 42 bu/A, 2015 at 45 bu/A, 2014 at 21 bu/A, 2013 at 15.5 bu/A, and 2012 at 18 bu/A. The 2018 yield range went from a low of 43 bu/A (WB4269) to a high of 61 bu/A (LCS Jet). Eltan soft white winter was included as a check yielding 53 bu/A. LCS Jet, UI SRG, LCS Rocket, and Yellowstone were the top yielding hard winter wheat varieties, at 61, 56, 55, and 54 bu/A, respectively. Average grain protein was good at 12.4%, reflecting adequate nitrogen levels to meet yield and protein in this season. Test weights were excellent and averaged 62 lbs/bu. There was no lodging. The ratio of applied N to average bushel yield was 1.6 lbs N/bu. The comparison of Keldin at 53 bu/A with Keldin with in-furrow fertilizer of 11-52-0 at 51 bu/A was not significantly different.

The soft white winter wheat (Table 24) yields varied from 40 bu/A to 65 bu/A, with the site averaging 52 bu/A, 19 bu/A more than 2017. Average proteins were good to high for this soft group at 11.6%, but test weights were excellent and averaged 60.6 lbs/bu. The ratio of applied N to average bushel yield was 1.6 N/bu. The top-yielding varieties were UI Sparrow, Eltan, WB1783, Otto, Bruneau and LCS Hulk (65, 57, 57, 57, 57, and 56 bu/A, respectively). Average heading date was 6/14, and average plant height was 27 inches.

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

The hard red and white winter wheat trial at the Hofmeisters' was planted September 27th and harvested July 26th. Snow mold diseases were not a significant problem, and spring stands were good for hard winter wheat (Table 13) and soft winter wheat (Table 25). Dwarf bunt (*Tilletia controversa* Kuhn) was not a problem this year, but all winter varieties were included in dwarf bunt testing in Logan, UT, by Dr. David Hole, Utah State University professor and wheat breeder. Results of the dwarf bunt variety trial screening are in Addendums 1&2. When using varieties that are susceptible to dwarf bunt, it is highly recommended that an appropriate seed treatment is used to prevent dwarf bunt infection.

The hard winter wheat yield average was 38 bu/A, a little lower than the 2017 average of 42 bu/A, the 2016 yield average of 43 bu/A, the 2015 average of 47 bu/A, and greater than 2014 at 37 bu/A. Previous years' yield averages include 2013 at 18 bu/A, 2012 at 30 bu/A, 2011 at 27 bu/A, and 2010 yield

average of 39 bu/A. The 2018 yield ranged from 24 to 46 bu/A. The top yielding varieties this year were UICF Grace (46 bu/A), LCS Jet (45 bu/A), Sequoia (45 bu/A), SY Clearstone 2CL (44 bu/A) and Keldin + 11-52-0 (43 bu/A). The Keldin 11-52-0 included an in-furrow application of monoammonium phosphate at 20 lbs phosphate per acre, but yields (43 bu/A) were not statistically different than Keldin QC and Keldin without the in-furrow fertilizer (37.9 and 37.4 bu/A). With an LSD of 7.7 bu/A, the yield of Keldin with 11-52-0 would have to be 45.6 bu/A to be considered significant. Grain proteins were low (10%), indicating a deficit in available nitrogen to make protein for hard winter wheat.

A small soft white winter nursery was included at this location, which is well-suited for hard winter wheat production. Many area producers choose soft white winter varieties for production, so the soft white winter nursery was expanded. The soft white winter varieties UI Sparrow, LCS Hulk, Norwest Tandem, Norwest Duet and UI Magic averaged 44, 44, 43, 41 and 41 bu/A, respectively (Table 25). The test weights were good, averaging 60.3 lbs/bu, as was grain protein at 9.0%, below the optimum for soft white winter, indicating a deficit of available N in the soil. There was no lodging.

Soda Springs, Mark and Craig Ozburn, Dryland Winter Wheat

The two small dryland winter wheat trials of both hard and soft winter wheat were increased to full nurseries at Soda Springs at the request of area growers. The trial was planted October 5th and harvested August 28th and 29th.

In the hard winter trial (Table 14), forty-four varieties of hard red and hard white wheat were planted, in addition to one check with in-furrow phosphorus fertilizer and another "QC" variety. The Keldin 11-52-0 included an in-furrow application of monoammonium phosphate at 20 lbs phosphate per acre, but yields (80 bu/A) were not statistically different than Keldin QC and Keldin without the in-furrow fertilizer (75 and 74 bu/A). With an LSD of 10.4 bu/A, the yield of Keldin with 11-52-0 would have to be 10.4 bu/A higher than the other Keldin treatments to be considered significant.

The highest yielding varieties of the hard variety trial included Keldin +11-52-0 (80 bu/A, Yellowstone (79 bu/A), WB4311 (74 bu/A and Norwest 553/Yellowstone mix (73 bu/A). The Norwest 553 alone yielded 49.3 bu/A. This variety has sensitivity to dry cold conditions and, as in this trial with stands of 56%, winter kills in some environments. Heading dates were significantly behind other locations (as expected) with the average heading 6/21. Grain protein was very good, averaging 13.2%. Test weight was a little low, averaging 57.2 lbs/bu. There was no lodging. The ratio of available and applied N (169 lbs N/A) to average bushel yield (73) was 2.6 N/bu. As a result, the proteins were very good with the trial average of 13.2%.

Thirty-five soft white winter wheat varieties were included in a separate nursery (Table 26). Fall germination was good resulting in an average 84-100% spring stand. A dry summer resulted in yields about 20 bu/A less than in 2016, and 7 bu less than 2017, but decent CV's. Average yields for the soft nursery were 73 bu/A. The yield ranged from 60 bu/A (UI Castle) to 82 bu/A (advanced line IDN10-08606A). The highest yielding named varieties included SY Banks (82 bu/A), UI Sparrow (81 bu/A), Bruneau (80 bu/A), Eltan (77 bu/A), WB1529 (77 bu/A) and WB1783 (76 bu/A). There was no lodging.

The ratio of available and applied N (169 lbs N/A) to average bushel yield (73) was 2.3 N/bu. As a result, the proteins were high with the trial average of 12.6%.

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.

Spring Grain Locations

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

The variety trials in Rupert were planted April 10th and harvested August 20th in silt loam soils. The preceding crop was sugar beets. There were no major weather-related problems.

There was no lodging for the **hard spring wheat** nursery (Table 36). Average yield was 120 bu/A, compared to 110 bu/A in 2017, 125 bu/A in 2016, and 105 bu/A in 2015. Test weight average was 61.7 lbs/bu, and average protein was at 13.6%. The top yielding named varieties were Dayn (144 bu/A and 12.5% protein), Klasic (132 bu/A and 14.3% protein), SY Teton (131 bu/A and 12.7% protein), LCS Iron (127 bu/A and 12.3% protein), and SY Coho (126 bu/A and 13.6% protein). The ratio of available and applied N (365 lbs N/A) to average bushel yield (120) was 3.0 lbs N/bu. The average grain protein for this trial was low at 13.6%.

The **soft white spring wheat** yield (Table 45) average was 123 bu/A. In 2017 it was 119 bu/A, 2016 it 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 2018, Seahawk yielded 137 bu/A at 11.2% grain protein, Ryan yielded 133 bu/A at 10.9% protein, WB6430 yielded 126 bu/A at 10.7% protein. Grain protein average was at 11.2%. The ratio of available and applied N (259 lbs N/A) to average bushel yield (123) was 2.1 lbs N/bu.

The **spring malt barley** trial at Rupert (Table 53) had average yields of 148 bu/A, about 10 bu/A more than 2017, with a yield range from 129 to 167 bu/A. Lodging averaged 17% overall, and grain protein averaged 11%. SY Sirish was the top yielding malt barley (167 bu/A), followed by LCS Sienna (166 bu/A), Genie (161 bu/A), LCS Opera (161 bu/A) and AAC Connect (160 bu/A). Test weights averaged 53.1 lbs/bu, proteins were 11%, and percent plumps were 96%. The ratio of available and applied N (259 lbs N/A) to average bushel yield (148) was 1.8 lbs N/bu.

The average yield for two-rowed feed barley in Rupert for 2018 (Table 61) was 151 bu/A, about 10 bu/A greater than 2017, about 2.5 bu greater as 2016. The high yielding two-rowed feed varieties were the six-rowed Millennium (172 bu/A), Oreana (171 bu/A), Claymore (163 bu/A), Xena (150 bu/A) and Altorado (142 bu/A). Average test weight for this trial was 52.9 lbs/bu for the feed barleys, and 58.1 lbs/bu for hulless food barleys. The hulless, high beta-glucan food barleys Julie, Transit, and Goldenhart yielded 132, 128, and 112 bu/A but also had high test weights (57.1, 56.4 and 60.8 lbs/bu, respectively). For this trial, the ratio of available and applied N (259 lbs N/A) to average bushel yield (144 bu/A for both feed and food barley) was 1.8 lbs N/bu with an average site grain protein of 11.0% for the hulled, and 12.7% for the hulless.

Aberdeen Research and Extension Center, Spring Grain

Spring variety trials were planted April 9th in Declo loam soils and plots were harvested August 13th - 15th. The preceding crop was green manure oats. Stripe rust of wheat was present late in the season and there were some yield impacts in the susceptible wheat varieties. The CV's for the Aberdeen spring trials were very low, with the CV for the hard spring wheat nursery at 6.2% for yield (Table 37). Hard spring wheat yield varied from 106 bu/A (Imperial durum) to 151

bu/A (WA 8285). The top three varieties for yield in the hard red and white trial were the hard white spring Dayn (142 bu/A with 13.9% protein), and the hard reds SY Renegade (139 bu/A with 13% protein), SY Coho (138 bu/A with 14.4% protein) and LCS Iron (137 bu/A with 13.4% protein). Test weights for the hard spring wheats averaged 62.1 lbs/bu. There was no lodging and the grain protein average was 13.7%. (All hard spring wheat trials are top-dressed at flowering with 40 units of N to promote higher protein hard spring wheat.) The high protein wheats included WB 9590 (15.2%) Alum (15.1 %), WB9668 (15.1%), WB9411 (14.5%), SY Coho (14.4%) and Imperial (durum 17.6 %). The ratio of available and applied N (415 lbs N/A) to average bushel yield (126) was 3.3 lbs N/bu with an average site grain protein of 13.7%.

Klasic hard white spring wheat was seeded at three rates: the standard 1 million seeds per acre, and at 1.2 and 1.4 million seeds per acre. Yields were 124.1 bu/A, 120.6 bu/a, and 128.5 seeds per acre. The LSD for this location was 10.9 bu/A, indicating no statistically significant difference between the highest (1.4 million) and the lowest rates (1.2 million) and no advantage for increasing the seeding rate to improve yield.

The soft white spring wheat yields at Aberdeen (Table 46) averaged 138 bu/A with a range from 122 (WB1035CL+) to 154 bu/A. Highest yields of named varieties were obtained from WB6430 (154 bu/A), UI Stone (153 bu/A), Seahawk (145 bu/A), Ryan (145 bu/A), and Melba (club at 143 bu/A). Test weights averaged 61.2 lbs/bu and grain protein averages were 11.0%. The ratio of available and applied N (306 lbs N/A) to average bushel yield (138) was 2.2 lbs N/bu with an average site grain protein of 11.0%.

Two-rowed malt barley lines averaged 138 bu/A (Table 54), 6 bu/A greater than 2017, and ranged from 117 (Merit 57) to 174 bu/A. The top yielding lines were Esma (174 bu/A), Sangria (170 bu/), Manta 168 bu/A), SY Sirish (162 bu/A) and LCS Sienna (156 bu/A). Grain protein averaged 11.5%. The ratio of available and applied N (306 lbs N/A) to average bushel yield (138 bu/A) was 2.2 lbs N/bu with an average site grain protein of 11.5%.

The average yield for two-rowed feed barley in Aberdeen for 2018 (Table 62) was 149 bu/A, 4 bu/A greater than 2017, about the same as 2016. The high yielding two-rowed feed varieties were Altorado (174 bu/A), six-rowed Millennium (158 bu/A), Champion (157 bu/A) and Oreana (155 bu/A). Average feed barley test weight for this trial was very good (51.8 lbs/bu). The hulless, high beta-glucan food barleys Julie, Transit, and Goldenhart yielded 140, 131, and 77 bu/A but also had high test weights (56.4, 55.3 and 56.4 lbs/bu, respectively). For this trial, the ratio of available and applied N (259 lbs N/A) to average bushel yield (141 bu/A) was 1.8 lbs N/bu with an average site grain protein of 11.5% for the feed, and 12.5% for the food.

Idaho Falls, Marc Thiel, Spring Grain

The Idaho Falls location followed alfalfa, was planted April 17th in silt loam soils and harvested August 16th. The surrounding field was in barley.

Average grain yield for the hard spring wheat (Table 38) was 119 bu/A, which was 7 bushels less than the average in 2017, and 32 bu greater than 2016 of 88 bu/A. Hard spring wheat ranged in yield from 85 (Imperial durum) to 141 bu/A (WA 8285). Average grain protein was at 14.0%, and test weight was at 62.4 lbs/bu. The four highest yielding named varieties were Dayn hard white (140 bu/A and 13.1% protein), Klasic hard white (132 bu/A and 12.9% protein), Alum (130 bu/A and 13.7% protein) and Jefferson (128 bu/A and 13.6% protein). There was no lodging. The ratio of available

and applied N (291 lbs N/A) to average bushel yield (119.2) was 2.4 lbs N/bu.

Klasic hard white spring wheat was seeded at three rates: the standard 1 million seeds per acre, and at 1.2 and 1.4 million seeds per acre. Yields were 131.9 bu/A, 131.4 bu/a, and 129.8 seeds per acre, indicating no advantage for increasing the seeding rate to improve yield.

Ryan, Alturas, SY Saltese, UI Stone and WB6430 topped the yield chart (Table 47) for the soft white spring wheat varieties at Idaho Falls at 148, 144, 141 and 137 bu/A, respectively, with an overall average of 132 bu/A, 6 bu/A less than 2017 and 41 bu/A greater than 2016. Yields ranged from 114 bu/A (WB1035CL+) to 148 bu/A. Test weights were good at 62.1 lbs/bu, and grain proteins were at 10.1%. The ratio of available and applied N (251 lbs N/A) to average bushel yield (132.3) was 1.9 lbs N/bu.

Two-rowed malt barley yields (Table 55) averaged 136 bu/A, about 2 bu/A more than 2017 and 22 bu/A more than in 2016. Merit 57 yielded 117 bu/A while the highest yielding variety (Esma) hit 166 bu/A. Top yielding named varieties included Esma (166 bu/A), Moravian 179 (153 bu/A), ABI Voyager (153 bu/A), LCS Odyssey (148 bu/A), and Sangria (148 bu/A). Test weight average was 51.8 lbs/bu, protein average was 11.0% and lodging was 28%. The ratio of available and applied N (251 lbs N/A) to average bushel yield (136.4) was 1.8 lbs N/bu with an average site grain protein of 11.0%.

Two-rowed feed barley trial (Table 63) averaged 137 bu/A, with the top yielding lines averaging 157 bu/A (Altorado) with 55.1 lb test weight. Oreana yielded 145 bu/A, the six-rowed feed variety Millennium yielded 143 bu/A, and Champion 137 bu/A. The test weight average for the feed lines was 52.6 lbs/bu and protein average was 10.7%. The presence of hulless food barleys in the trial will pull the test weight averages higher so they were averaged separately. Test weight of the food lines averaged 56.6 bu/A and the protein was at 11.1%. The ratio of available and applied N (251 lbs N/A) to average bushel yield (132.6) was 1.9 lbs N/bu with a f barley average grain protein of 10.7%.

Ashton, Alan Baum, Spring Grain

The Ashton location was planted April 27th in silt loam soil following potato. Plots were harvested August 16th.

Two factors are important in plant health and reducing yield potential (above stripe rust impacting crop) in this area. Soil pH can be low, sometimes below 6 which can contribute to high micro-nutrient accumulations (magnesium, manganese, iron and boron). This location was good at pH 6.5. Other fields in the area may demonstrate symptoms of leaf necrosis (browning) as the pH varied 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 contribute 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 the 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 2016 Small Grains Report available online http://www.uidaho.edu/extension/cereals/scseidaho/sgr.

The average yield for the hard spring wheat (Table 39) was 100 bu/A, compared to 2017 at 83 bu/A and 2016 at 88 bu/A, 2015 at 94 bu/A and 2014 at 100 bu/A. The range in yield varied from 72 bu/A (WB7328 hard

white spring) to 128 bu/A (advanced hard red 12SB0197). Test weights were high at 62.2 lbs/A, and protein averaged 13.4%. The high yielding varieties were Dayn (118 bu/A), SY Renegade (115 bu/A) and SY Coho (114 bu/A). The highest proteins were seen in WB9668 (15.0%), WB9590 (14.6%), and WB9411 (14.5%). The ratio of available and applied N (266 lbs N/A) to average bushel yield (100) was 2.7 lbs N/bu. The average protein levels for hard spring wheat was 13.4%.

In the soft spring wheat trial (Table 48), Alturas yielded 115 bu/A, followed by Ryan (103 bu/A), Seahawk (103 bu/A), WB6430 (102 bu/A) and Melba 102 bu/A). The average yield for the soft white spring trial was 99 bu/A, lower than 2017 by 3 bu/A, higher than in 2016 by 3 bu/A, and ranged from a low of 88 bu/A (UI Pettit) to a high of 115 bu/A. The test weight average was a 60.4 lbs/A, with no lodging. Grain protein averaged 10.9%, a good target for soft white spring wheat. The ratio of available and applied N (226 lbs N/A) to average bushel yield (99.3) was 2.3 lbs N/bu.

Two-rowed malt barley yields (Table 56) ranged from 75 bu/A (CDC Bow) to 127 bu/A (SY Sirish). The average was 101 bu/A, 6 bu less than 2017, and 15 bu/A less than in 2016. The highest yielding named lines was SY Sirish (127 bu/A), LCS Odyssey (118 bu/A), LCS Sienna (116 bu/A), LCS Genie (113 bu/A) and ABI Growler (113 bu/A). There was no lodging. Overall test weight was 51.5 lbs/bu, protein averages were 11.5% and plumps were 89%. The N: bu ratio calculates as 2.3 lbs N/bu.

The feed lines averaged 109 bu/A with Altorado (132 bu/A), Champion (121 bu/A) and Claymore (113 bu/A) as the top yielding varieties (Table 64). Kardia is a hulled, high beta-glucan food line. The food lines had a test weight of 50.0 lbs/bu and food lines had a test weight of 55 lbs/bu. Proteins of the feed lines averaged 11.0%, with a N:bu ratio of 2.2 lbs N/bu.

Soda Springs, Kyle Wangemann and Scott Brown, Spring Wheat

The only spring dryland extension trials in Soda Springs were the spring wheat trials. The nursery was planted May 3rd and harvested August 29th. The previous crop was spring barley. Similar to Ashton, this location has relatively low soil pH (6.5) as compared to other locations.

Yield averages for the hard red and hard white spring nursery (Table 40) were 46 bu/A, 19 bu/A better than 2017. The range in yield went from 38 to 60 bu/A (Dayn). The five highest yielding named varieties were the hard white Dayn (60 bu/A), hard red Duclair (56.2), LCS Iron (56 bu/A), NS Presser CLP (54.9 bu/A) and SY Teton (52 bu/A). Test weights averaged 58.0 lbs/bu, and proteins were good, averaging 14.0%, with the highest proteins in WB9668 (15.8%), Choteau (15.1%) and WB9578 (14.7%). The N:bu ratio calculates as (hard spring wheat N at 140 lbs/A/ to 46 bu average yield) 3.0 lbs N/bu, and grain protein averaged 14%.

For the soft white spring wheat (Table 49), the nursery averaged 58 bu/A, 24 bu/A greater than 2017. The yield ranged from 49 to 74 bu/A. Tekoa, Melba, SY Saltese and Alturas were the four top yielding varieties at 74, 66, 62 and 61 bu/A, respectively. Test weight average was 58.7 lbs/bu, and proteins were at 11.1%. The N:bu ratio calculates as 2.4 lbs N/bu, and the grain protein remained low at 11.1%.

Table 2. Variety Descriptions

SPRING BARLEY - Malt

AAC Connect – first year in the trials, AAC Connect has malt quality similar to AC Metcalfe. AAC Connect is a mid-maturity two-rowed variety with moderate resistance stem rust, spot blotch, spot form of net blotch (SFNB), and Fusarium head blight (FHB). Under Idaho growing conditions, AAC Connect was 4 inches taller than average but with excellent lodging resistance, high test weight and percent plumps. AAC Connect had the highest percent protein in the trial, and was at lower than average for yield (Table 52). AAC Connect was released in 2016 by Agriculture Canada.

AAC Synergy – released in 2015 by Agriculture Canada, AAC Synergy is a two-rowed malt barley in the fourth year of testing in these trials. Overall yield was below average (Table 51), with average test weight and plumps. Height of Synergy is less than Copeland, higher than Conrad, with similar tendencies for lodging. In Fusarium head blight (FHB) screening trials, AAC Synergy had one of the lowest indices for infection and was average for levels of DON on the seed. AAC Synergy also expressed high levels of resistance to foliar pathogens. Synergy is being marketed by Syngenta in the US.

ABI Eagle (2B11-4949) – a new release by Busch Agricultural Resources in 2019, Eagle has been tested in the variety trials for two years. In 2018, Eagle did well in Ashton, Idaho Falls, and Soda Springs and overall (Table 52) yields were similar to AAC Connect and ABI Growler. Heading date and plumps were similar to ABI Growler, and was two inches shorter. Test weight was good. In 2017, Eagle performance was very similar to Conrad. FHB reaction initially has been similar to ABI Voyager.

ABI Growler (2B09-3425) – a 2015 release from Busch Agricultural Resources, ABI Growler is a two-rowed malt that exhibits high yield potential under irrigation, although the three-year average was lower than other two-rowed malt barley in these trials (Table 51). Growler hits the average for test weight, heading date, proteins and plumps, and can be taller than average (Table 52) with average lodging tendency. For FHB data, DON accumulations are about average.

ABI Voyager (B3719) – a 2011 release from Busch Agricultural Resources, Voyager consistently out yields many other two-rowed malt varieties. Three-year average yields were below LCS Odyssey and similar to LCS Genie. Voyager is similar to Conrad in test weight, heading date, lodging and protein, but is taller (2-4 inches). ABI Voyager is susceptible to cereal cyst nematode (CCN), and for FHB shows DON accumulation at average.

AC Metcalfe (TR232) – two-rowed malting barley released in 1994 by Agriculture and Agri-Food Canada with lower yield potential than average, and taller with similar test weight and lodging to Conrad. It is widely adapted to western US and Canadian conditions, but as it is tall, it may lodge under higher production conditions. It is moderately susceptible to FHB with average DON accumulation. Malting quality and extract are excellent.

CDC Bow (TR11127) – CDC Bow is a recent two-rowed malt variety from Crop Development Centre, University of

Saskatchewan, and marketed through SeCan CDC Bow has strong straw strength with large plump kernels and average grain protein and in 2018 performed similar to CDC Copeland in the Idaho trials (Table 22). CDC Bow is susceptible to FHB.

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 yields are similar to Conrad and Moravian 69. Copeland was 3-5 in taller than average, and was average for grain protein and lodging, with good test weight. In 2017 Fusarium head blight (FHB) screening trials, CDC Copeland had low indices for FHB infection and had average DON levels in the grain.

CDC Fraser (TR12135) – CDC Fraser is a more recent malt variety from Crop Development Centre, University of Saskatchewan. For the first year in the trials, CDC Fraser outperformed AC Metcalfe by 118% and performed similar to ABI Voyager (Table 52), with yields, test weight, heading date and protein at average, and plumps above average. CDC Fraser is adapted to western Canada, was taller than average with higher lodging potential under high input conditions. Malt profile is intermediate between CDC Copeland and AC Metcalfe.

Conrad (B5057) – two-rowed spring malt barley released by Busch Agricultural Resources in 2005. Conrad has below average yields and good test weight. Conrad is 3 inches shorter than ABI Voyager, is average for lodging and protein. Conrad has yielded well in the dryland upper elevation areas. Conrad has low disease measures for FHB, but higher DON levels on the seed.

Esma – entered into the trials in 2018 by Ackermann Saatzucht GmbH & Co. KG, Esma was the highest yielding two-rowed malt variety, averaging 170 bu/A (Table 52, Chart 7). Like many of the European malt types, Esma is suited for the craft beer market. In eastern Idaho, Esma had good test weight, headed slightly earlier than average, and was shorter but average for lodging.

Explorer – a newer introduction from Secobra Recherches, Explorer is a two-rowed malting barley in the second year of these trials. Explorer was at trial averages in grain yield (Table 52), protein, plump, and test weight. Explorer was later in heading, shorter than average and at the trial average for lodging. Explorer has good resistance to leaf diseases and is widely adapted. Explorer is a French maltsters preferred variety with excellent malting and brewing, and is good for brewing and distilling (whiskey).

Full Pint – released in 2014 by Oregon State University for the Craft market, Full Pint was tested in 2018 in the eastern Idaho variety trials. Yields averaged greater than LCS Genie and Moravian 69, with excellent test weight and protein (Table 52). Full Pint was the earliest for heading, and a little over average for lodging, but may be due to a late harvest after physiological maturity.

GemCraft (2Ab08-X05M010-65) – released by the USDA-ARS and Idaho AES in 2018, GemCraft is a 2-row malt barley released for the craft industry and favored by the Brewers Association due to its good taste profile. Overall a great performing agronomic line, yields in 2018 were above Conrad but with lower test weight and plumps. Taller than average with medium maturity, lodging tends to be greater under irrigated production systems. GemCraft will be released under PVP.

LCS Genie – a European malt barley released in the U.S. through Limagrain Cereal Seeds, Genie is a short-statured two-rowed malt variety with yields and test weight similar to ABI Voyager. Protein and plumps of Genie were at trial averages. LCS Genie is about 2-3 inches shorter than average with average lodging. Genie is susceptible to FHB and had high levels of DON in seed in the FHB disease nurseries. Genie has excellent malt quality and can also be used in distilling.

LCS Odyssey – LCS Odyssey is a European two-rowed malt barley released and distributed through Limagrain Cereal Seeds. In three years of testing, LCS Odyssey was the highest yielding variety, comparable to LCS Genie and ABI Voyager. 2018 yields were comparable to Moravian 69 (Table 52). Test weights were lower and lodging was average, even as LCS Odyssey is 3-5 inches shorter than the trial average. Heading date is one to three days later than average, and similar to LCS Genie. Proteins were average, and plumps were good. LCS Odyssey is more susceptible than current U.S. malt varieties for FHB and has higher levels of DON accumulation. LCS Odyssey has excellent resistance to CCN populations in eastern and southern Idaho. Like Genie, Odyssey has excellent malt quality and can also be used in distilling.

LCS Opera – LCS Opera is another two-rowed European malt from Limagrain Cereal Seeds. Like Genie and Odyssey, LCS Opera has excellent malt quality and can also be used in distilling. In the second year of testing (2018), LCS Opera yields were similar to ABI Growler, and about five bushels less than trial average. Test weight was below average, and heading date is three to four days later than average (Table 52). LCS Opera is shorter than average (3 inches), with average lodging and protein. LCS Opera is more susceptible than current U.S. malt varieties for FHB and has higher levels of DON accumulation.

LCS Sienna – a two-rowed malt from Limagrain Cereal Seeds in the second year of testing in the 2018 trials. LCS Sienna was similar agronomically to LCS Genie but slightly taller (2 inches). LCS Sienna was higher yielding than average (Table 52), and susceptible to lodging under irrigation. LCS Sienna is more susceptible than current U.S. malt varieties for FHB. Like Genie, Sienna has excellent malt quality and can also be used in distilling.

Manta – a two-rowed spring malt barley developed through Ackermann Saatzucht GmbH & Co. KG, Manta represents typical European malt quality targeted for the craft beer industry. Manta yields in the 2018 irrigated trials averaged 154 bu/A (Table 52, Chart 7), reaching 168 bu/A in Aberdeen (Table 54). Plumps were less than Esma and Sangria, and lodging was higher 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, with 3-year yield average over all locations similar to ABI Voyager and higher than Copeland (Table 51). 2018 yields were comparable to LCS Genie and Odyssey (Table 52). M69 is short (2-4 inches below average) but may still be susceptible to lodging. Protein is at average in these trials. Test weight was below average. Moravian 69 is considered more susceptible to FHB with higher than average accumulation of DON in the seed.

Moravian 165 – a newly released malt barley variety from MillerCoors with better

adaptation to dryland production conditions. Moravian 165 was grown only in the Soda Springs area in 2018 under limited conditions (Table 57). Moravian 165 was average for heading, yield, protein and plump at that location. MillerCoors lines are under Title V and PVP.

Moravian 179 – Moravian 179 is a newly released two-rowed malt line from MillerCoors adapted to the higher production conditions of southern Idaho. Yields of Moravian 179 were greater than LCS Genie and M69 and significantly higher than average (Table 52), with very high plumps and test weight and low lodging. Proteins were at trial average, with plant height similar to M69. MillerCoors lines are under Title V and PVP.

Sangria – a two-rowed spring malt barley developed through Ackermann Saatzucht GmbH & Co. KG, Sangria and Manta represent typical European malt quality targeted for the craft beer industry. In the first year of extension testing, Sangria yields were excellent, averaging 159 bu/A (Table 52, Chart 7), with good lodging resistance, high plumps, and good protein and test weight. Yields in Aberdeen reached 170 bu/A (Table 54).

SY Sirish – SY Sirish is a European two-rowed spring malt barley currently marketed by Syngenta. In its second year of testing, SY Sirish had yields comparable to Moravian 179 (Table52, Chart 7), was three inches taller with less lodging (Table 52). SY Sirish is more susceptible than current U.S. malt varieties for FHB and has higher levels of DON accumulation.

SPRING BARLEY – Food

Goldenhart (2Ab09-X06F058HL-31) – A spring 2-row hulless food barley with beta-glucan content similar to Transit (9-10%) with significantly increased yield potential, especially under dryland conditions. Goldenhart has very high test weight, plump and protein (Table 60) as expected for a hulless line. Goldenhart will be submitted for PVP.

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 previous industry standards such as CDC McGwire. Julie is the highest yielding hulless waxy barley in the current trials. Lodging of Julie is less than average, and heading date 4-5 days later than Champion.

Kardia (2Ab09-X06F084-51) – Kardia is a two-rowed, hulled food barley line released in 2016 by the USDA-ARS in Aberdeen and the University of Idaho AES as a replacement for Salute, with yield improvement of 4-5% over Salute. Yield of Kardia in 2018 was similar to the hulless lines Julie and Transit (Table 60), and over three years of testing was similar in yield to Idagold II (Table 59). The beta-glucan level of Kardia is 8.5% compared to 6.5% in Salute. Kardia has slightly higher levels of DON in the inoculated head blight trials than the hulless food barley lines.

Transit (03AH3054-51) – a two-rowed hulless variety released by the USDA-ARS and the University of Idaho AES in 2010 for high-beta glucan content (waxy) and intended for human consumption. Seed beta-glucan content (9-10%) is higher than other previous industry standards such as CDC Fibar and CDC McGwire. Transit yields are

lower but the percent beta-glucan is higher than Julie. As a hulless line, test weights are high for barley. Transit had low disease ratings for FHB and lower DON levels.

SPRING BARLEY – Feed

Altorado (BZ509-601) – Altorado is a 2016 release from Highland Specialty Grains. Altorado is a two-rowed feed barley with high yield potential. Average irrigated 3-yr average yield was greater than Champion with high test weight (Table 59). Altorado is similar to Champion in heading date, test weight, plant height, lodging, and grain protein.

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 were comparable to Xena and Lenetah under irrigation with higher test weight and plumps. Champion has average height, less than average protein, and heads 1-2 days earlier than trial average.

Claymore (BZ509-216) – two-rowed feed originally developed through WestBred, Claymore is carried by Highland Specialty Grains. In three-year averages, Claymore out-yielded other feed lines, including Xena, Lenetah and Champion, and was comparable to Altorado and Oreana. Claymore is similar in height to Champion (Table 59) with similar lodging.

Idagold II (C32) – a two-rowed spring feed and malt line developed by Coors Brewing Company in Burley and released in 2002. Idagold II is a short line with lower than average lodging and high test weight. Protein is average for a malt variety with average plumps. Idagold II is susceptible to FHB and showed higher levels of DON accumulated in the seed.

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 producing well in irrigated southern Idaho conditions. In southern Idaho, Lenetah has average yield, test weight and plump, average heading date and height. Lenetah yields and lodging are similar to Champion.

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 for six-rowed varieties, taller than two-rowed lines. Millennium has lower test weight and plump, and heads several days earlier than average. Millennium is susceptible to FHB and will accumulate high levels of DON.

Oreana (BZ509-448) – a two-rowed feed barley originally developed through WestBred, Oreana is carried by Highland Specialty Grains. In three-year data averages (Table 59), Oreana had good test weight, excellent yields similar to Claymore and Altorado, and was 4-5 inches shorter than average. Oreana showed intermediate reaction to FHB and showed higher levels of DON accumulated in the seed.

Xena (BZ594-19) – a two-rowed spring feed barley released by Western Plant Breeders that is now handled by Highland Specialty Grain. Xena has had very high yields over the locations tested from 2010-

2017, similar to Champion. Xena is of average height and straw strength. Test weight tends to be slightly higher than average, but less than Champion. Xena has shown low FHB disease and lower DON levels.

WINTER BARLEY – Malt

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 variety average (Table 28, 29, Chart 4). 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.

Delicatesse – a winter two-rowed malt variety from Secobra Recherches in the second year of testing in southeastern Idaho. Due to poor winter conditions in 2016-17, only the Aberdeen location was successfully harvested, but even with a spring stand of 76%, Delicatesse yielded 154 bu/A. In 2017-18, Delicatesse averaged 194 bu/A with 54.5 lb/bu test weight (Table 29, Chart 4). Heading date was three days earlier than the trial averages, and plumps and protein were excellent. Lodging was lower than average, with average protein.

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 yields were low in comparison (Table 29, Chart 4) for 2018. Endeavor has good test weight and protein, but had relatively low plumps for malt (Table 28).

Etincel – is a 6-rowed malt line from Secobra Recherches, first entered in the trials in 2016-17. Etincel is widely grown in France and is a preferred variety for brewing. Etincel is a high yielding, high plump, low-protein, early maturity variety with lower lodging under high production conditions in southern Idaho (Table 29). Etincel has good winter hardiness, high-tillering capacity and average plant height.

KWS Scala (GW2895) – 2-rowed winter malting variety from KWS Lochow, marketed in the US through KWS Cereals. KWS Scala yielded above 2018 trial averages (Table 29) with good test weight, protein and plump. Scala had good spring stand, earlier heading date and was slightly shorter than trial average. Testing in the Logan, UT area in 2012 and 2013 indicated good winter survival.

KWS Somerset (GW3479) – 2-rowed winter malting variety from KWS Lochow, marketed in the US through KWS Cereals. In the first year of testing in southern Idaho, Somerset yields were comparable to Etincel and KWS Scala with good test weight, winter survival and plump. Heading dates, plant height and grain protein were about average.

LCS Calypso – a two-rowed winter malt barley brought in by Limagrain Cereal seeds in 2016-17, Calypso is in the second year of testing in southeastern Idaho. LCS Calypso has shown excellent yield potential in southern Idaho, similar to Delicatesse, with 188 bu/A and 53.9 lb/bu test weight (Table 29, Chart 4). In Aberdeen (Table 31)

Calypso yielded 212 bu/A with little to no lodging. Calypso was earlier in heading (3 days) and 4 inches taller than average with excellent percent plump.

Madness –a winter two-rowed malt variety from Secobra in the first year of testing. Due to poor winter conditions, only the Aberdeen location was successfully completed. Madness had poor winter survival at Aberdeen, surviving the winter at 37% of stand. Madness yielded 100 bu/A. Test weight was above average, and heading date and protein were at the trial average (Table 29). Plumps and protein were excellent.

Maltesse –another winter two-rowed malt variety from Secobra Recherches in the second year of testing. Due to poor winter conditions, only the Aberdeen location was successfully completed in 2016-17, but even with a spring stand of 60%, Maltesse yielded 141 bu/A. In 2018, yields of Maltesse averaged 184 bu/A with good test weight at 54.1 lbs/bu. Heading date was one day earlier than the trial average and lodging was average (Table 29). Plumps and protein were excellent.

Rubinesse – a winter two-rowed malt variety also from Secobra. Rubinesse yielded below average in 2017-18 testing. Test weight was average, and heading date was four days later than the trial average (Table 29) and six days later than Delicatesse. Plumps and protein were average.

Thunder (10.0777) – Thunder is a two-rowed winter malt release from Oregon State University (2016). Thunder averaged 161 bu/A over the three-year summary (Table 28) with good test weight and spring stand. Heading date was five days earlier than the trial average and plant height was five inches less. Plump was above average and lodging was at trial averages, better than Endeavor and Charles. In 2018, Thunder yields were comparable to KWS Scala and Wintmalt, and was shorter but with a tendency to lodge.

Voyel –a winter two-rowed malt variety from Secobra Recherches in France. Voyel is early, has above average test weight, has good protein and very high plumps (Table 29). Voyel has good disease resistance and excellent lodging resistance. Yield of Voyel in 2017-18 was similar to KWS Somerset and KWS Scala, and about 10 bu/A greater than Wintmalt.

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 third year of testing, Wintmalt heading date, lodging, protein, yields and test weight were at trial average. Wintmalt yields in 2018 were average, heading was 1 day later than average, but plumps were excellent.

WINTER BARLEY – Feed and Food

Buck (09-OR-86) – Oregon State University hulless, 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 very high test weight (60.3 lbs/bu) due to the hulless seed trait (Table 28). In 2017-18, Buck yields (132 bu/A) were comparable to Charles (Table 29). Buck is awned and can be used as food, feed or malt. Plumps are low.

Eight-Twelve – a six-rowed winter feed barley released by the USDA-ARS and the Idaho AES in 1991. Eight-Twelve yields averaged 137 bu/A under irrigation in 2016-2018 (Table 28). Eight-Twelve has good winter survival but will lodge under high production conditions.

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 the high-yielding European malt lines. Test weight and plant height is below is average. Heading date is up to a week to ten days later than average, with low plumps.

Upspring (05ARS748-270) – Upspring is a hulless, high beta-glucan winter barley variety and the latest food barley released from USDA-ARS breeding program in conjunction with the University of Idaho AES. Upspring was released as an alternative to Buck. While agronomically similar to Buck, Upspring headed three to six days later, had greater percentages of plump seed and had 2% higher grain protein (Table 29). Seed germination may be low under dryland conditions. Upspring will be released under PVP.

SPRING WHEAT – Soft White

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, is average in yield, test weight, heading date and height. Alturas is susceptible to the current races of stripe rust and is moderately susceptible to Fusarium head blight (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 wheat with below average yields, and high lodging potential under irrigated conditions. Louise is susceptible to stripe rust and FHB.

Melba (WA8193) – Melba is a club wheat developed by USDA-ARS in Pullman and released in conjunction with the Washington AES in 2016. Melba is one of the first club wheats with good yield performance in southeast Idaho, similar to Seahawk and UI Stone. Yield was good in Soda Springs (Table 49) and Aberdeen (Table 46). Melba is average in height with low protein. Melba is resistant to current races of stripe rust and "moderately resistant to FHB, similar to Seahawk.

Ryan (WA8214) – Ryan is a partial waxy soft white spring wheat released from Washington State University, AES and USDA in 2016. In the first year of testing, Ryan averaged higher in yield than other soft white spring wheat varieties over four irrigated locations (Table 44). Ryan has Hessian fly resistance, tolerance to low acid / high aluminum soils, and resistance (adult plant) to stripe rust. Ryan was early to heading, similar to UI Pettit, had good test weight and resistance to lodging.

Seahawk (WA8162) – a soft white spring wheat released from Washington State University's spring wheat breeding program in 2014 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 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 similar to UI Stone and WB6430 (Table 42). Plant height is a little above average and heading date 1-3 days later than average. Seahawk may have a tendency to lodge under high production practices.

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 years and four irrigated locations, SY Saltese, Seahawk and WB6430 yielded 123 bu/A (see Table 42). IN 2018, SY Saltese yields were 6 bu below Ryan, and similar to UI Stone (Table 44). SY Saltese also has good test weight and has resistance to stripe rust. SY Saltese may lodge under higher production situations and is susceptible to FHB.

Tekoa (WA8189) – a Washington State University 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. In 2018, Tekoa yields and test weight were at trial average. Tekoa is adapted to low pH soils where aluminum toxicity can occur. Tekoa is a little later in maturity (heading date) than average. Tekoa is resistant to stripe rust, Hessian fly, and moderately resistant to FHB, similar to Seahawk.

UI Pettit (IDO632) – is a soft white spring wheat released in 2006 through the Idaho AES. Yields and test weight are lower than average. UI Pettit is short and heads 3-5 days earlier than Alturas. UI Pettit is very susceptible to current races of stripe rust and 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 similar to Alturas (Table 42). UI Stone was selected for reduced FHB susceptibility, and carries the Fhb1 resistance gene. In 2018, UI Stone yielded slightly below Seahawk and about 7 bu/A below Ryan (Table 44). The FHB reaction in UI Stone is similar to Seahawk. 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.

WB6121 (BZ608-121) – soft white spring wheat released by WestBred (a unit of Bayer Crop Science) in 2015 intended for irrigated production areas. WB6121 has a Nick background but has good resistance to stripe rust. Tested for the third year in these trials, WB6121 yields were below average (Table 42 and 44) and similar to UI Pettit. WB6121 has excellent test weight, is 3 inches shorter than average and about two days earlier in heading than average. FHB disease reaction in 2017 showed greater levels of resistance than Seahawk and UI Stone, but additional testing is required.

WB6341 (BZ608-014) – a new soft white spring wheat in 2017 released by WestBred (a unit of Bayer Crop Science). Irrigated average yield of WB6341 (Table 44) was average and comparable to UI Stone, with good test weight, and a little shorter than average. Levels of grain protein were less than average, which is optimal for soft white spring wheats. Reaction to FHB was similar to Seahawk and UI Stone, but not as good as WB6121, with good resistance to stripe rust.

WB6430 (BZ608-125) – a soft white spring wheat released by WestBred (a unit of Bayer Crop Science) 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. FHB reaction is more susceptible than Seahawk, which is moderately resistant, and has high levels of DON accumulation in the grain.

SPRING WHEAT – Hard White, Hard Red, and Durum

Alum (WA8166) – hard red spring wheat released in 2015 for tolerance to aluminum in low pH soils. Over the three years in the trials, Alum has had above average yields, similar to WB9411 for yield and test weight, but higher in protein (Table 33). Alum heads about four days later than WB9411, is four to five 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 acidic soils are problematic, and it did well in dryland.

Alzada (YU894-75) – durum wheat released in 2004 by WestBred (a unit of Bayer Crop Science)
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. Alzada has solid stems and performs well in dryland areas where the stem sawfly is a problem.

Cabernet (95WV10616) – a 2007 hard red spring wheat from Resource Seeds, now Syngenta Cereals, Cabernet yields are similar to Jefferson and WB9411 (Table 33). Cabernet is a little shorter than average, (2 inches shorter than WB9411, 4-5 inches shorter than Jefferson), has average to good test weight and 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 susceptible to FHB.

Choteau – is a semidwarf hard red spring wheat released by Montana State University in 2003. Choteau has the solid-stem characteristic, which contributes to resistance to the stem sawfly. Choteau yields were below average and similar to Klasic under dryland conditions in Soda Springs (Table 40). Choteau is taller and 2-3 days later in maturity than Klasic. Choteau had good test weight and protein, and has acceptable end-use quality.

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 five years of the irrigated trials. Test weight is above average and heading date was at 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.

Duclair – a hard red spring developed and released by Montana AES, with solid stem characteristic that reduces impact from wheat stem sawfly. It is currently under testing for adaptability to southeast Idaho

conditions for areas where wheat stem sawfly is a problem. Duclair is an awned semidwarf variety, similar to Choteau, but heading one day earlier and about one inch taller. Yield of Duclair in Soda Springs was very good, comparable to Dayn (Table 40), with average test weight, heading date and spring stand. Duclair was lower in average in protein, but at 122% of trial average for yield, additional nitrogen was not available for making protein. Duclair is PVP protected.

Glee (WA8074) – hard red spring wheat released in 2012 through Washington State University with desirable end use quality and resistance to stripe rust. Glee is included in the trial as a quality check. Yield of Glee is average in the trials, similar to WB9411. Glee has good test weight, is taller than average (3 inches taller than WB9411) and is average for percent seed protein.

Imperial – a durum grain variety with awns that turn black with maturity, Imperial yields were less than Alzada in the trials. Imperial had low test weight and high grain protein (Table 35).

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 (about four inches under irrigation) and susceptible to lodging under irrigation. Irrigated and dryland yields have been at or below nursery averages (Table 33). Jefferson has good quality when there is adequate soil nitrogen and sulfur, when it has a minimum of 13% grain protein. Jefferson is susceptible to the current races of stripe rust and very susceptible to FHB, but resistant to Hessian Fly.

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 has good test weight, is 5-6 inches shorter than average, and is 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 infection can be high, as in 2016 trials. Triazole fungicides applied at flowering are highly recommended as a standard practice in growing Klasic. Two additional entries of Klasic at higher seeding rates were added to determine effect of seeding rate on yield. Klasic was seeded at 1, 1.2 and 1.4 million seeds per acre in all irrigated spring trials. Averaged across all locations (Table 35), the seeding rates resulted in 119.5, 119.2, and 125.8 bu/A for 1, 1.2 and 1.4 million seeds per acre. Given an LSD (alpha = 0.05) of 9 bu/A, there is no significant increase in yield resulting from higher seeding rates. In Idaho Falls (Table 38), all Klasic entries were within two bushels.

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 four years. Yields were similar to WB9411, with lower test weight, about 3-5 days later in heading, and 1-2% lower in grain protein. LCS Iron is resistant to current races of stripe rust, and was among the least susceptible hard red spring wheat to FHB (although still considered “moderately susceptible”). Top-dressing nitrogen at flowering is highly recommended to achieve hard red spring wheat targets.

LCS Luna (10SB0087-B) – LCS Luna is a hard-red spring wheat released by Limagrain Cereal Seeds in 2017. Luna yields in 2018 were comparable to Klasic with lower test weight. Yield and test weight were similar to the hard red spring SY Gunsight with lower grain protein (Table 35). LCS Luna had a later heading date than average, has good resistance to stripe rust and has good end-use quality.

NS Presser CLP – a hard red spring wheat released by Northern Seeds in 2018. NS Presser CLP is a two-gene Clearfield line. Clearfield wheats have resistance to imazamox herbicides such as to Beyond® herbicide for hard-to-control grassy weeds. Yield in 2018 was below average, similar to WB7328 (Table 35) with lower test weight. NS Presser CLP was 6 inches taller than the trial average, with very late maturity.

SY Coho (SY40292R) – released in 2015 by Syngenta Cereals, SY Coho has been tested in these trials for four years (see Table 33), with high yields similar to LCS Iron. SY Coho had lower than average test weight and average protein. SY Coho suffers yield loss if irrigation is lower than needed late in the growing season. SY Coho is moderately resistant to moderately susceptible to stripe rust and susceptible to FHB.

SY Gunsight (06PN3015-08) – Syngenta released this hard red spring in 2016. Average three-year yields were similar to LCS Iron and Alum (Table 33). Test weight and grain protein of SY Gunsight are average, with earlier heading dates than LCS Iron and Alum. It is moderately resistant to FHB and stripe rust, susceptible to Hessian fly.

SY Renegade (SY3017-9) – released in 2018, SY Renegade is a hard-red spring wheat tested in 2017 under dryland conditions in Soda Springs as 06PN3017-09. Under irrigation in 2018, SY Renegade was the top-yielding named hard red spring wheat, higher than SY Coho with better test weight. Heading was six days later than average and it was 5 inches taller than trial average with no lodging.

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 33). SY Teton was 10-14 bu/A less than Dayn for yield but with lower test weight and was three inches shorter (Table 35). Heading date is early, and grain protein is less than average. Reaction to head blight was similar to Dayn, which was less susceptible than the majority of hard white spring wheat varieties. SY Teton is moderately susceptible to stripe rust.

UI Platinum (IDO694C) – a University of Idaho and IAES hard white spring wheat, UI Platinum is an average yielding hard white spring wheat with good test weight and lodging resistance. Over the last three years, yield has been comparable to WB7589 and the red wheat Cabernet, and less than Dayn (W) and SY Teton (W) (Table 33). 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 stripe rust and very susceptible to FHB.

WB7202CLP (XA7320) – a new hard white spring wheat released by WestBred (a unit of Bayer Crop Science). In the second year of testing, the irrigated yield average of WB7202CLP was similar to WB7589 and UI Platinum and was below trial average. Test weight was higher, and heading date was earlier than trial average, and it was two

inches taller than Klasic. WB7202CLP is a two-gene Clearfield wheat with tolerance to imazamox herbicide Beyond®. Additional use of Clearfield tolerant wheat includes planting following beans where imazamox may have a residual presence in the soil, or to reduce wheat red volunteer in white spring wheat production. The FHB reaction of WB7202CLP was moderately susceptible.

WB7328 (BZS09-0133W) – most similar to Snow Crest, WB7328 is a hard-white spring wheat with similar agronomic characteristics as Snow Crest, but is a little shorter. Released in 2015 by WestBred (a unit of Bayer Crop Science) 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 almost all hard-white spring wheat, WB7328 is susceptible to FHB. Agronomically similar to Klasic, it is two inches taller and has higher grain protein (Table 33).

WB7589 (BZ9S09-0735W) – 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 Bayer Crop Science) as a replacement for Klasic, having better resistance to stripe rust and higher yield potential. WB7589 yields similar to UI Platinum (Table 33). Under heavy pressure, WB7589 was moderately resistant to stripe rust in 2016. Like all hard white spring wheat, WB7589 is susceptible to FHB.

WB9411 (BZ908-418) – hard red spring wheat released by WestBred (a unit of Bayer Crop Science) in 2014 intended for irrigated and high rainfall production areas. WB9411 was similar in yield to LCS Iron with significantly higher grain protein and test weight (Table 33, 35). 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 moderately resistant to FHB.

WB9433 (XA9503) – hard red spring wheat released by WestBred (a unit of Bayer Crop Science) in 2018, and tested in 2017 trials as XA9503. WB9433 yields were below trial average (Table 35) and it was shorter than average, similar in height to WB7589. Grain protein was 2 percent less than WB9668. WB9433 is resistant to stripe rust and has good end-use quality.

WB9578 - a red spring wheat released by WestBred (a unit of Bayer Crop Science) in 2017, and new in the trials. In the first year of testing, WB9578 was average for many agronomic characteristics with slightly higher than average yield, test weight, height and protein, and performed well in the Rupert area. Reaction for FHB was similar to WB9411, considered moderately resistant.

WB9590 – a hard red spring released by WestBred / Bayer Crop Science in 2018, yields in 2018 were similar to Jefferson (Table 35), with similar test weight and heading date. WB9590 was five inches shorter than Jefferson with greater grain protein content, averaging 14.8% over the irrigated locations. WB9590 is resistant to stripe rust and moderately susceptible to FHB.

WB9668 (BZ908-552) – a hard red spring wheat intended as a replacement for WestBred 936, WB9668 has been tested in the trials since 2014. Three-year data shows WB9668 to be lower than average for yield with excellent grain protein (Table 33). 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).

WINTER WHEAT – Soft White

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. In 2018, (Table 18) Brundage yielded 93% of SY Ovation and 90% of UI Sparrow, as stripe rust wasn't severe (Chart 3).

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. Despite that, Bruneau was the top yielding variety over the past three years (Table 16) across all irrigated locations comparable to SY Ovation and Bobtail. In 2018, Bruneau yields were comparable to UI Sparrow and WB1783 (Table 18 and Chart 3). 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 susceptible to dwarf bunt. Like Brundage, Bruneau sprouts easily but had higher Falling number (FN) values.

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. Yields are still consistently good in dryland trials (Table 17). 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, Eltan was susceptible to stripe rust, and is moderately resistant to moderately susceptible to dwarf bunt.

Jasper (WA 8169) –Jasper is a soft white winter wheat that 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 SY Assure and WB1529 but with lower test weight (Table 16). Jasper seems to adapt very well to high rainfall and irrigation and does very well when water becomes limited later in the season. Under dryland conditions, Jasper yields were comparable to Eltan. Jasper was better than Eltan for snow mold resistance, is resistant to moderately resistant to stripe rust, but is very susceptible to dwarf bunt.

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 three-year averages (Table 16 and Chart 3), LCS Artdeco yields were similar to UI Magic and LCS Drive. The yield and test weight were 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 Drive (LWW12-7105) – a 2015 release from Limagrain Cereal Seeds, LCS Drive is a low protein, soft white winter wheat with yields similar to UI Sparrow and LCS Artdeco (Table 16). In 2018, yields were below average, comparable to WB1376CLP. LCS Drive has low test weight and runs 3-5 inches shorter than average, with strong straw strength and has a good fit under irrigation with wheel lines. LCS Drive is susceptible to dwarf bunt, but should be grown under irrigated conditions where dwarf bunt pressure is low and with appropriate seed treatment. LCS Drive was very resistant to 2016 races of stripe rust.

LCS Hulk (LWW14-73163) – a soft white winter with released in 2018 by Limagrain Cereal Seeds for it's widespread adaptation throughout the PNW. Average yield of LCS Hulk was comparable to SY Ovation and Bobtail (Table 16) under irrigation and Otto under dryland conditions (Table 17), yielding 105% of irrigated average and 103% of trial average (Chart 3) in 2018. Height is average under irrigated and dryland conditions, and heading date is also at trial average. LCS Hulk has good test weight and low to average protein. LCS Hulk is susceptible to dwarf bunt.

LCS Shark (LWW14-71195) – Also a 2018 new release from Limagrain Cereal Seeds, LCS Shark is a soft white winter with high yield potential in the PNW. LCS Shark has resistance to stripe rust and soil-borne mosaic virus, endemic in some areas of the Palouse but not currently a problem in southern Idaho. 2018 performance of LCS Shark was average for yield, height and two days earlier in heading date than trial average. LCS Shark is susceptible to dwarf bunt.

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 2015-2017 irrigated combined data performed above trial average for yield and below for test weight. In 2018, Norwest Duet was included only in the dryland locations, where it performed less than average for yield and test weight (Table 19). Heading date was 1 day earlier than average for the trial. Grain protein was slightly below average. Norwest Duet is moderately susceptible to dwarf bunt.

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 average in 2016-2018 combined data, similar to UI Sparrow and UI Castle (Table 16). Tandem had average test weight, and 2 days earlier later in heading date with strong straw strength. Dry land yields were above trial averages (Table 17) and similar to Bruneau. 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 both are 5 days later in heading than trial average. Otto has higher yield potential than Eltan, similar to Bruneau and UI Sparrow (Table 17) with similar test weight to Eltan. Otto will have similar snow mold tolerance to Eltan and also is moderately resistant to dwarf bunt.

Rosalyn (OR2071071) – a soft white winter, 2013 release from Oregon State University and the USDA-ARS, Rosalyn irrigated and dryland yields in 2018 were above average (Table 18 and 19, respectively), and test weight and grain protein were less than average. Rosalyn is moderately resistant to dwarf bunt.

Stephens (OR65-116) – a 1977 soft white winter release from Oregon AES, Stephens is still widely grown in southwestern Idaho. Yield and test weight under irrigation are below average (Table 16 and Chart 3). Stephens heading date and protein are at average. End-use quality is poor. Stephens is moderately susceptible to dwarf bunt, and does not have good resistance to BYDV, snow mold or stripe rust.

SY Assure (SY 96-2) – a soft white winter wheat released in 2016 by Syngenta Cereals, yield in 2016-2018 irrigated trials was comparable to Jasper and WB1529 (Table 16) with very good test weight. Heading was earlier than the trial average by four to five days, and four days earlier than WB1529. SY Assure is 1 inch shorter than average. SY Assure is moderately resistant to moderately susceptible to dwarf bunt, and resistant to stripe rust.

SY Banks (SY5#25) – a soft white winter wheat derived from a Xerpha x Madsen cross, SY Banks was released by Syngenta in 2017 for dryland production areas. SY Banks did well in 2017 at Ririe, and in 2018 in Soda Springs (Table 26), but overall had average yield, heading date and below average test weight (Table 19). SY Banks was moderately susceptible to dwarf bunt.

SY Command (SY66-7) – Syngenta released SY Command in 2017, a soft white winter wheat intended for dryland production areas. SY Command yields in 2018 were similar to UI Castle and less than Stephens with low test weight (Table 19 and Chart 3). SY Command performed better at the higher rainfall areas. SY Command had very low grain protein and was shorter than average. SY Command is susceptible to dwarf bunt.

SY Dayton (SY62#18) – a soft white winter wheat adapted to the Dayton, WA area and released by Syngenta in 2017. Yield for SY Dayton in 2017 was similar to Norwest Duet with the same test weight and heading date, but Dayton was five inches shorter. In 2018, SY Dayton was very similar agronomically to Bruneau (Table 18 and Chart 3) yield, test weight, grain protein and spring stand, but headed two days earlier and was 2 inches shorter with better straw strength. SY Dayton has two genes for resistance to soil-borne mosaic virus, has good tolerance to C-stripe and stripe rust, and is very susceptible to dwarf bunt.

SY Ovation (03PN108#21) – a soft white winter wheat released by Syngenta Cereals in 2011. SY Ovation has had excellent yields over the past five years, similar to Bobtail with much better test weight. Heading date, height, lodging, test weight and grain protein were average (see Table 16 and Chart 3). SY Ovation is resistant to soil-borne mosaic virus, moderately resistant to current races of stripe rust and susceptible to dwarf bunt. SY Ovation has good end-use quality and threshability.

UI Castle CL+ (IDN 09-DH10) – UI Castle CL+ 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 CL+ was released in 2015 as a joint release from the Idaho AES and LCS seeds, and for the three-year averages (Table 16), the irrigated yields were at trial average, similar to Norwest Tandem. It was three to four days later in heading than average, three days later than SY Ovation, and more prone to lodging. Test weight of UI Castle CL+ was average, and dryland yields were at trial average (Table 17). UI Castle CL+ is intermediate in

resistance to stripe rust, and susceptible to dwarf bunt.

UI Magic CL+ (IDN 09-DH11) – UI Magic CL+ 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 CL+ was released in 2015 as a joint release from the Idaho AES and LCS seeds. Yields in 2016-2018 were below trial average (Table 16); however, in 2018 yields were excellent, and in Aberdeen yield of UI Magic CL+ was 188 bu/A (Table 22). Test weight is slightly above average and similar to UI Castle CL+, heading date and lodging are at trial averages. UI Magic CL+ is moderately susceptible to stripe rust and to dwarf bunt.

UI Sparrow (IDO1108) – a 2016 release from the University of Idaho, UI Sparrow is a soft white winter wheat with high yield potential in irrigated and dryland production. While adapted to both, UI Sparrow has a higher tendency to lodge under irrigated production. Irrigated conditions in 2018 were more favorable for high yield of UI Sparrow than 2016 and 2017 (Table 16 and Chart 3), with yield at Aberdeen reaching 185 bu/A (Table 22). Three-year irrigated yield was below average and similar to UI Castle CL+. UI Sparrow has lower test weight and a later heading date than average under irrigation (Table 16). Under dryland conditions, UI Sparrow was the top yielding variety over the past three years (Table 17). 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.

WB 456 (BU6W99-456) – a soft white winter wheat from WestBred (a unit of Bayer Crop Science). WB 456 was released as an improvement over WB 470 and as a replacement for WB 528. WB 456 yielded slightly more than Stephens in the past three years (Table 16) and had high test weight. 2018 yields were below average (Table 16 and Chart 3). WB 456 is shorter than Stephens with improved lodging resistance. WB 456 has an early heading date, 3-5 days earlier than average, and is moderately resistant to stripe rust. WB 456 is susceptible to dwarf bunt.

WB1376CLP (WB-1038CL) – soft white winter wheat released by WestBred (a unit of Bayer Crop Science) in 2015. WB1376CLP is an imi-tolerant, soft white winter wheat, containing two genes for tolerance to BASF's grass herbicide Beyond®. Yields were below average (similar to WB1070CL and above UI Magic) but with excellent test weights (Table 16, 18, 19). Height is average and 1-2 inches taller than WB 456. WB1376CLP is susceptible to dwarf bunt, and moderately resistant to moderately susceptible to stripe rust.

WB1529 (BZ6W07-436) – soft white winter wheat released in 2014 by WestBred (a unit of Bayer Crop Science). Yields of WB1529 under irrigation are similar to Bobtail and Jasper over three years 2016-2018 (Table 16), with much higher test weight and similar lodging potential. Grain protein was at nursery averages. Dryland yields of WB1529 were similar to UI Sparrow and Eltan (Table 19). WB1529 has good milling and baking quality. WB1529 is resistant to current races of stripe rust and resistant to dwarf bunt.

WB1604 (BZ6W07-458) – a new soft white winter wheat tested in 2017 and 2018,

WB1604 is an early maturing WestBred variety with less than average yield in both years (Table 18), but higher than average test weight. WB1604 is an inch shorter than average with good straw strength, is very resistant to stripe rust and is susceptible to dwarf bunt. WB1604 has good milling and baking quality.

WB1783 (BZ6W09-471) – a high yielding soft white winter wheat released in 2016 by WestBred (a unit of Bayer Crop Science). Irrigated yield averaged higher than SY Ovation, Bruneau and LCS Hulk (Table 16), with excellent test weight and good straw strength. Multiple year and location dryland yields were also good, comparable to UI Sparrow (Table 17). Irrigated yield in 2018 was very good (Table 18 and Chart 3), comparable to SY Ovation and UI Sparrow. Dryland yields (Table 19) were also excellent, similar to Bruneau, Eltan and WB1529. At Aberdeen, WB1783 2018 yield hit 197 bu/A (Table 22). WB1783 is very resistant to stripe rust and very susceptible to dwarf bunt.

WINTER WHEAT– Hard Red and White

AAC Wildfire – AAC Wildfire is an awned, bronze chaffed hard red winter wheat developed at Agriculture and Agri-Food Canada Lethbridge and marketed by SeCan. First tested in 2018, AAC Wildfire was at trial average for yield under irrigated (Table 6) and dryland conditions (Table 7) but had very good test weight. Heading date was four days later than Keldin, it was an inch taller than Keldin with half a percentage point higher in grain protein (Table 6). AAC Wildfire is resistant to stripe rust, but very susceptible to dwarf bunt.

Bearpaw (MTS0721) – a hard red winter released in 2011 by the Montana AES for dryland wheat production. Bearpaw is a short, 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 susceptible to stripe rust. Yields of Bearpaw were low in the dryland conditions in southern Idaho (Table 5 and Chart 2) and test weight was average. Bearpaw is susceptible to dwarf bunt (DB).

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 UI SRG and Utah 100 under 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.

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. Three-year yields place Deloris slightly above average with good test weight. Plant height is 2-3 inches taller than average (Table 5). Deloris is very susceptible to stripe rust and very 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 test weight is below average, with average yield, and low grain protein. Plant height was an inch less than Deloris and two inches greater than trial average (Table 5). Golden Spike is very resistant to dwarf bunt, but is susceptible to stripe rust.

Greenville (UT9743-42) – Utah AES released Greenville hard red winter wheat in 2010 for irrigated production. Greenville is short, was below average for 3-year average yield under irrigation (Table 4 and Chart 2) and dryland conditions. Test weight and lodging were below average, heading date and grain protein were at trial average. Greenville currently is moderately resistant to stripe and dwarf bunt.

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 dryland production (Table 5 and Chart 2), is extremely tall and will lodge under irrigation. Juniper has good test weight and protein. Juniper performs similar to Golden Spike (W) and Norwest 553, 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 Bayer Crop Science) for irrigated production, Keldin had the second highest average yield of the hard red winter wheat tested in these trials from 2016-2018 (Table 4). Comparable to Yellowstone and LCS Jet, yields are excellent under irrigated and dryland conditions (Table 5) In 2018, Keldin yields were 177 bu/A (Aberdeen, Table 10) and 178 bu/A (Rupert, Table 9). Keldin is a little shorter than average for height, has very high test weight, and is below average for grain protein. Keldin is susceptible to dwarf bunt and in 2016 was moderately susceptible to current races of stripe rust.

Keldin (QC) – In several tables Keldin (QC) was added for "Quality Control", an internal measure of trial variability. All QC entries are a duplicate and technically should be exactly like the other entry. Ideally, the duplicate entries will be very close in yield and within the LSD for the trial. Under irrigation (Table 6), Keldin QC yield was 157.3 bu/A, and Keldin was 149.4 bu/A, a difference of 7.9 bu/A. While that may seem significant, the LSD for the trial is 9.8, indicating that differences of less than 9.8 are not statistically significantly different, and fall within the margin of error. In Table 15, under dryland conditions, Keldin QC and Keldin were separated by 1.2 bu/A, well within the LSD of 5.2 bu/A.

Keldin + 11-52-0 – In-furrow fertilizer was added to one variety in the hard winter and soft winter group to test the effect of starter fertilizer on yield. (Monoammonium phosphate or 11-52-0 at 20 lbs phosphate per acre was included in-furrow). In Table 6, Keldin and Keldin +11-52-0 were within 2 bushels of each other, and very similar in other agronomic traits, indicating no effect of starter fertilizer on yield, etc. Under dryland conditions (Table 7), Keldin + 11-52-0 was 3.1 bu/A greater than Keldin, but with the LSD of 5.2 bu/A, there is no statistically significant difference between the two for yield.

LCS Jet (NSA 7208) – a hard red winter with released in 2015 by Limagrain Cereal Seeds. LCS Jet has excellent yield potential (Table 4 irrigated, 7 dryland) and has been the top yielding hard red winter for the previous five years of irrigated testing. In 2018, LCS Jet yielded 108% of irrigated mean (Chart 2). Test weight, grain protein and lodging has been below average, and LCS Jet has been 3 inches shorter than average. LCS Jet is very susceptible to dwarf bunt and moderately resistant to stripe rust. LCS Jet has good end use quality.

LCS Rocket (NSA10-2196) – is a hard red winter wheat released from Limagrain Cereal Seeds in 2018, demonstrating high yield potential in Northern Idaho and the Palouse area in high rainfall zones. Irrigated

average yield in 2018 was below trial average (Table 6), with low test weight and grain protein. Yields in 2017 under irrigation were comparable to Utah 100 and in 2018 were comparable to Norwest 553. LCS Rocket has resistance to stripe rust and is susceptible to dwarf bunt.

LCS Yeti (LCI13DH-2222) – LCS Yeti is a hard white winter wheat released in 2018 by Limagrain Cereal Seeds. LCS Yeti yields under dryland production in the past three years (Table 5) were at trial average, 5 bu/A less than UI Silver, with very good test weight. LCS Yeti had very good protein, 1% higher than UI Silver. LCS Yeti headed three days earlier than average, was one inch shorter and lower in protein. LCS Yeti is susceptible to dwarf bunt (DB) and needs seed treatment if grown in areas prone to DB disease. LCS Yeti is moderately susceptible to stripe rust and resistant to soil-borne mosaic virus.

Loma (MTS1224) – Loma is a white glumed, awned, hard red winter release from Montana State University with semi-solid stems with some resistance to stem sawfly. Loma is a semi-dwarf variety derived from a cross with Yellowstone. Loma is medium-late in maturity, one day later heading than Yellowstone. Under irrigation, Loma was at trial averages for yield, test weight, plant height and protein (Table 4, Chart 2). Loma very susceptible to dwarf bunt and resistant to stripe rust.

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 Juniper.

Mandala – a European hard red winter wheat distributed through Tri-State Seeds, and tested for the first time in 2017. 2017 yield and test weight over irrigated locations were at nursery average, while in 2018 yields were greater than average at Kimberly. Test weight was very high in 2018 (Table 8, 9). Mandala has good winter hardiness. Protein was below average and Mandala was a little taller than average. Mandala is very susceptible to dwarf bunt.

Metropolis – Metropolis is a hard red winter wheat distributed through Tri-State Seeds. In 2018, Metropolis had below average yields, very good test weight (Table 6), and in 2017 high lodging under irrigation. Protein was a higher than average, but with lower yields there is increased nitrogen available for grain protein. Metropolis is very susceptible to dwarf bunt.

Northern (MT0978) – a Montana State University 2015 release, Northern is a hard red winter wheat in the fourth year of these trials. Northern yields were at average of 3-year irrigated trials (Table 4), similar to Utah 100, with slightly higher test weight and similar protein levels. Heading date was 3 days later than trial average, it was two inches taller than average and five inches shorter than Utah 100. Dry land yield was at average. Northern is susceptible to dwarf bunt and moderately resistant 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 well

(Table 4) under irrigation, comparable to Whetstone. 2018 yields and test weight were lower than average (Table 6 and Chart 2). Norwest 553 is 4-5 inches shorter than average with excellent lodging resistance. Grain protein, test weight, and heading date were at trial average. Winter hardiness is a problem in some years especially when entering the winter under dry conditions. Norwest 553 is susceptible 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. Over the past three years of testing (Table 5), Promontory yields were at trial average with excellent test weight. Promontory is resistant to dwarf bunt and moderately susceptible to stripe rust.

Rebelde – a European hard red winter wheat distributed through Tri-State Seeds, and tested for the first time in 2017. Rebelde had below average yields and good test weight in both 2018 and 2017 (Table 6, Chart 2). Rebelde was short with slightly earlier heading date. Rebelde was very susceptible to dwarf bunt.

Sequoia (WA8180) – a hard red winter wheat released in 2015 by Washington State University AES and the USDA-ARS, Sequoia was tested for the first time in the 2017-18 trial. Sequoia was released for its combination of emergence and high yield in rainfed production areas receiving less than 12 inches of precipitation in the deep-furrow planting systems of Oregon and Washington. Under dryland conditions in southern Idaho, yield of Sequoia was at trial average (Table 7), with slightly higher than average test weight. Sequoia is tall, 2 inches shorter than Juniper with 1.5% less grain protein. Sequoia did not perform well under irrigation as lodging was severe. Sequoia was moderately susceptible to dwarf bunt, similar to Eltan.

SY Clearstone 2CL (MT CL1077) – a hard red winter wheat release by Syngenta in 2014, 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 Yellowstone (Table 5, Chart 2). Like Yellowstone, SY Clearstone 2CL is taller than average and may lodge under irrigation. SY Clearstone 2CL is moderately resistant to dwarf bunt, and moderately resistant to stripe rust.

SY Touchstone (04PN028B-3) – SY Touchstone is a short hard red winter wheat that performed similar to Norwest 553 and Whetstone in 2016-18 irrigated trials (Table 4), with very good test weight and grain protein. Released by Syngenta Cereals in 2016, SY Touchstone is shorter in plant height than Keldin with good straw strength. SY Touchstone did not perform well under dryland conditions (Table 5). It is winter hardy, has good snow mold tolerance, moderately resistant to stripe rust and 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 5). 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 SrTmp 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 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 years have been well above dryland average, comparable to Keldin and Curlew (Table 5). 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 (Table 5), with slightly 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.

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 (Table 4) and dryland (Table 5) 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 resistant to current races of stripe rust.

Warhorse (MTS0808) – Warhorse, an awned, white-glumed, semidwarf (Rht1) hard red winter wheat with medium maturity, was a 2014 release from Montana AES. Warhorse is adapted to dry land conditions having below average yields in 2016-2018, similar to Juniper and Norwest 553, with high protein (Table 5). 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.

WB4269 – a hard red winter wheat released by WestBred (a unit of Bayer Crop Science) in 2018, WB4269 has one year in testing in southern Idaho Extension trials. Irrigated average was below trial mean (Table 6), but WB4269 had excellent test weight. Height was two inches shorter than trial average, and three inches shorter than Keldin. Heading date was three days earlier than Keldin. Under dryland conditions, yield averages were low, similar to Norwest 553 (Table 7).

WB4311 – released in 2018 by WestBred / Bayer Crop Science, WB4311 is a hard-red winter wheat released for its yield potential, standability, test weight and protein. WB4311 had good yield in dryland areas in 2018 (Table 7). WB4311 average irrigated yield in 2018 was below trial average, but had excellent test weight, was two days earlier in heading, and had high grain protein. WB4311 has good stripe rust resistance and winter hardiness.

WB4418 – new to the trials in 2018, WB4418 is a hard-red wheat released by WestBred / Bayer Crop Science in 2018 for its yield potential, resistance to Hessian fly, wheat stem sawfly and wheat streak mosaic virus. In 2018, yield of WB4418 was 177 bu/A under irrigation at Aberdeen (Table 10), with the highest dryland average yield (Table 7) in the trials. Under irrigation, test weight and protein were above trial averages (Table 6). WB4418 is moderately resistant to stripe rust.

WB4623CLP – a hard red winter wheat released by WestBred (a unit of Bayer Crop Science), WB4623CLP is a two-gene Clearfield wheat. Clearfield wheats have resistance to imazamox herbicides such as Beyond® for hard-to-control grassy weeds. WB4623CLP had below average yields similar to Juniper (dryland) and Greenville (irrigated) with excellent test weight (Tables 6,7). Heading date was average, and plant height was one inch taller than average under irrigation. WB4623CLP is susceptible to dwarf bunt.

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 three to five days earlier than irrigated 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 below average (Table 4, Chart 2), 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 (Table 4, Chart 2) and dryland conditions (Table 5) of southeast Idaho. In 2018 at Aberdeen, Yellowstone yields reached 177 bu/A (Table 10), and 170 bu/A in Rupert (Table 9). 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 moderately resistant to dwarf bunt and moderately susceptible to stripe rust.

Table 3. Ten year averages of selected agronomic characteristics, 2008-2017 compared to 2018.

NOTE: "Average" values are for years 2008 to 2017

Winter Wheat (all market classes and locations)

YIELD			TEST WEIGHT			PLANT HEIGHT			HEADING DATE				LODGING		
	# of			# of			# of			# of		Days		# of	
Year	Loc.	bu/A	Year	Loc.	lb/bu	Year	Loc.	in.	Year	Loc.	date	fr. Jan.1	Year	Loc.	%
2018	7	104	2008	5	60.9	2015	6	35	2011	5	6/19	171	2014	5	25
2015	6	103	2017	6	60.8	2016	6	35	2010	5	6/18	171	2010	5	21
2009	5	102	2018	6	60.3	2009	5	35	2008	5	6/14	166	2009	5	17
2012	5	102	2010	5	60.3	2010	5	34	2009	5	6/9	162	2016	6	11
2014	4	101	2011	5	60.2	2018	7	33	**Avg.**	---	**6/8**	**160**	**Avg.**	---	**10**
2010	5	95	2009	5	60.0	2011	5	32	2017	6	6/6	159	2011	5	9
2016	6	94	2012	5	59.7	**Avg.**	---	**32**	2013	5	6/5	158	2013	5	8
Avg.	---	**93**	**Avg.**	---	**59.5**	2014	5	32	2014	5	6/4	157	2012	5	5
2017	6	91	2016	6	59.4	2013	5	31	2018	7	6/4	157	2015	6	4
2011	5	86	2013	5	59.4	2012	5	30	2012	5	6/3	156	2008	5	4
2008	5	80	2015	6	58.1	2008	4	30	2016	6	5/31	152	2018	7	1
2013	5	79	2014	4	56.1	2017	6	29	2015	6	5/31	152	2017	6	0

Spring Wheat (all market classes and locations)

YIELD			TEST WEIGHT			PLANT HEIGHT			HEADING DATE				LODGING		
	# of			# of			# of			# of		Days		# of	
Year	Loc.	bu/A	Year	Loc.	lb/bu	Year	Loc.	in.	Year	Loc.	date	fr. Jan.1	Year	Loc.	%
2014	5	107	2016	5	61.9	2014	4	34	2008	5	7/9	192	2014	4	16
2009	5	107	2009	5	61.8	2009	5	34	2010	5	7/9	192	2010	5	5
2018	5	106	2017	5	61.6	2010	5	33	2011	5	7/9	192	**Avg.**	---	**3**
2008	5	102	2013	5	61.4	2011	5	32	2009	5	7/3	185	2011	5	3
2017	5	98	2012	5	61.4	2018	5	31	**Avg.**	---	**6/28**	**180**	2016	5	3
2015	5	97	2015	5	61.0	**Avg.**	---	**31**	2012	5	6/24	177	2015	5	2
Avg.	---	**96**	2018	5	61.0	2016	5	31	2017	5	6/23	176	2013	5	2
2011	5	96	2008	5	60.7	2008	5	30	2013	5	6/22	175	2017	5	1
2010	5	91	**Avg.**	---	**60.6**	2015	5	30	2016	5	6/20	173	2008	5	0.5
2016	5	91	2010	5	60.6	2012	5	30	2018	5	6/20	172	2012	5	0.4
2012	5	90	2011	5	59.2	2017	5	28	2015	5	6/18	170	2018	5	0.3
2013	5	86	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		
	# of			# of			# of			# of		Days		# of	
Year	Loc.	bu/A	Year	Loc.	lb/bu	Year	Loc.	in.	Year	Loc.	date	fr. Jan.1	Year	Loc.	%
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	2013	4	33
2017	4	128	2010	4	51.7	2009	4	34	2010	4	7/4	187	2011	5	26
2014	4	127	2013	4	51.6	2018	5	34	2009	4	6/30	183	2015	4	24
2015	4	124	2011	5	51.6	2011	5	33	**Avg.**	---	**6/27**	**180**	2010	4	24
2013	4	122	2017	4	51.4	**Avg.**	---	**33**	2012	4	6/24	177	**Avg.**	---	**22**
Avg.	---	**121**	**Avg.**	---	**51.4**	2013	4	33	2017	4	6/24	176	2017	4	17
2009	4	118	2012	4	51.4	2015	4	33	2014	4	6/23	176	2008	5	15
2018	5	117	2018	5	51.4	2017	4	31	2018	5	6/23	176	2009	4	13
2008	5	114	2008	5	50.7	2008	5	31	2013	4	6/20	173	2016	5	11
2011	5	112	2015	4	50.6	2016	5	31	2016	5	6/20	172	2018	5	10
2010	4	106	2014	4	48.8	2012	4	30	2015	4	6/15	168	2012	4	0.4

Table 4. Hard Winter Wheat Irrigated Nurseries, 3-Year Averages (2016-2018; 10 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
LCS Jet	147.7	60.0	94	5/27	34	3	11.7
Keldin	143.1	62.4	97	5/28	37	9	11.6
WA8252 (W)	142.2	61.2	93	5/30	41	10	11.9
Yellowstone	142.1	61.0	95	5/30	40	9	12.1
Northern	137.0	60.1	94	6/1	39	11	12.2
Utah 100	136.4	59.4	96	6/1	44	4	12.2
Loma	136.4	60.6	94	6/1	37	14	12.4
Whetstone	135.8	61.5	93	5/26	38	8	12.7
Norwest 553	135.7	60.8	94	5/29	34	1	12.3
SY Touchstone (W)	135.2	61.7	94	5/30	35	3	12.6
Irv (W)	134.9	59.7	93	5/29	36	7	12.4
IDO1101 (W)	133.3	61.6	97	5/28	34	9	12.3
Greenville	131.2	60.1	96	5/28	32	1	12.0
Warhorse	124.3	61.6	95	5/30	39	9	13.5
Average	136.8	60.8	95	5/29	37	7	12.3
LSD (α =.05)	6.0	0.5	3.3	0.6	0.8	4.5	0.5
CV%	9.9	1.8	7.9	0.9	5.0	145.2	4.5
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

(W) = White

Table 5. Hard Winter Wheat Dryland Nurseries 3-Year Averages (2016-2018; 9 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Yellowstone	57.8	61.4	94	6/9	30	0.0	11.2
SY Clearstone 2CL	57.4	61.4	96	6/8	30	0.0	11.0
IDO1101 (W)	56.6	62.6	96	6/9	26	0.0	10.4
LCS Jet	56.1	58.7	96	6/8	24	0.0	10.1
Keldin	55.8	61.9	95	6/8	28	0.0	10.3
UI Silver (W)	55.8	61.9	95	6/11	30	0.1	10.5
UI SRG	54.7	61.1	97	6/9	33	0.0	11.1
Curlew	53.5	61.8	95	6/9	31	0.0	11.1
Utah 100	52.4	60.2	95	6/11	32	0.0	11.2
Northern	52.1	61.0	93	6/11	27	0.1	11.7
Deloris	51.7	61.9	96	6/12	32	0.0	11.2
Irv (W)	51.3	60.1	94	6/9	27	0.0	11.1
Promontory	51.1	62.7	95	6/8	30	0.0	11.3
UICF Grace (W)	50.6	60.6	96	6/7	36	0.0	10.9
LCS Yeti (W)	50.6	62.5	97	6/6	28	0.0	11.7
Eltan (SWW)	50.1	59.7	92	6/13	28	0.0	10.1
Golden Spike (W)	49.6	60.8	96	6/10	31	0.0	10.7
Loma	49.0	61.1	94	6/11	26	0.0	11.5
Juniper	48.8	61.7	95	6/10	36	0.0	12.0
Warhorse	48.2	61.6	96	6/9	26	0.0	12.5
Norwest 553	47.8	60.8	88	6/9	25	0.0	11.3
Lucin-CL	46.2	61.9	94	6/9	33	0.0	11.8
Greenville	45.2	60.4	94	6/9	23	0.0	10.7
Whetstone	44.8	61.6	92	6/8	26	0.0	12.0
SY Touchstone (W)	43.3	61.6	94	6/12	23	0.0	11.6
Bearpaw	40.1	61.3	91	6/8	26	0.0	12.0
Average	50.8	61.2	94	6/9	29	0	11.2
LSD (α =.05)	4.0	0.4	2.4	0.6	0.9	0.1	0.7
CV%	16.1	1.2	5.1	0.7	6.6	1956.7	6.5
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	0.0462	<.0001

(W) = White
(SWW) = Soft White Winter Wheat

Table 6. Irrigated Hard Winter Wheat Data Combined from Kimberly, Rupert, Aberdeen, and Rexburg, 2018.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
IDO1706 (W)	161.1	59.1	97	5/30	40	5	12.0
Keldin (QC)	157.3	62.9	97	5/30	39	3	10.6
XB4542	157.2	63.2	97	6/1	43	0	11.5
WA8252 (W)	155.0	61.9	98	6/1	42	6	11.0
WA8268	154.5	59.7	96	5/31	34	0	11.7
Yellowstone	154.2	61.6	97	6/1	40	5	11.4
LCS Jet	153.1	60.8	97	5/29	35	0	11.4
OR2130118H (W)	152.7	63.0	97	5/30	36	3	12.0
Northern	152.2	61.2	98	6/2	40	6	11.6
Utah 100	150.9	60.7	97	6/2	44	0	11.5
Norwest 553/Yellowstone	150.0	61.4	97	5/31	40	0	11.9
Keldin	149.4	63.1	97	5/30	38	2	11.3
Keldin + 11-52-0	147.3	63.0	96	5/31	38	7	11.6
WA8294	146.2	60.3	97	5/29	34	0	12.8
LWW14-73915	146.0	59.7	98	5/29	36	0	11.5
IDO1101 (W)	145.4	62.0	97	5/31	36	2	11.9
Whetstone	144.1	62.5	97	5/27	38	0	10.8
Loma	143.7	61.4	96	6/2	38	7	12.1
SY Touchstone (W)	143.2	62.1	97	6/1	37	0	11.9
AAC Wildfire	142.8	62.4	96	6/3	39	2	11.7
OR2130021R	141.4	61.8	96	6/1	37	0	11.9
Irv (W)	141.1	60.6	97	5/30	37	0	11.5
Mandala	140.5	63.5	99	6/2	39	0	11.4
MTF1432	140.0	60.2	97	6/3	44	16	12.1
WB4418	139.7	62.3	96	5/26	38	0	12.8
LCS Rocket	136.1	59.5	97	5/29	35	0	11.1
Norwest 553	135.7	60.8	96	6/1	35	0	12.1
Greenville	133.8	60.9	97	5/30	33	0	11.9
Warhorse	133.6	62.7	97	6/1	40	0	11.7
WB4623CLP	132.8	63.3	97	5/31	39	4	12.0
WB4311	132.8	63.4	98	5/28	35	0	12.0
OR2120358H	131.9	60.8	98	6/1	37	8	12.5
Sequoia	131.9	60.4	95	6/7	47	90	12.1
WB4269	131.7	63.2	96	5/27	36	0	12.2
IDO1607	129.0	60.1	95	6/3	37	7	12.4
MTF1435	126.6	60.9	97	5/31	45	1	12.8
IDO1506 (W)	120.1	60.0	97	5/30	30	5	12.1
Metropolis	117.7	63.6	98	5/29	35	0	13.1
Rebelde	109.2	63.7	98	5/30	38	0	12.7
Average	141.3	61.7	97	5/31	38	4	11.9
LSD (α = .05)	9.8	0.5	1.7	0.8	1.2	5.9	1.0
CV%	9.4	1.0	2.4	0.7	4.4	268.3	5.9
Pr >F	<.0001	<.0001	0.1766	<.0001	<.0001	<.0001	0.0090

(W) = White

Table 7. Dryland Hard Winter Wheat Data Combined from Ririe, Soda Springs, and Rockland, 2018.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
WB4418	59.9	60.5	93	6/13	27	0	12.1
LCS Jet	59.0	58.3	94	6/11	25	0	11.1
Keldin + 11-52-0	57.7	61.5	97	6/10	28	0	10.2
Yellowstone	57.2	61.0	95	6/11	30	0	12.1
UI SRG	56.1	60.3	96	6/12	35	0	12.0
XB4542	55.9	61.6	92	6/11	31	0	10.9
SY Clearstone 2CL	55.3	60.7	95	6/11	31	0	12.1
WB4311	55.2	61.9	91	6/9	26	0	12.0
MTF1432	54.9	59.4	96	6/13	33	0	11.8
Deloris	54.7	61.5	96	6/13	34	0	11.9
Keldin	54.6	61.2	94	6/11	28	0	11.4
Norwest 553/Yellowstone	54.6	60.9	95	6/11	30	0	11.4
Curlew	54.1	60.9	94	6/11	32	0	12.1
Keldin (QC)	53.4	61.4	96	6/11	29	0	11.2
Northern	53.2	61.1	92	6/12	28	0	11.9
UICF Grace (W)	52.4	59.9	97	6/11	37	0	12.2
Lucin-CL	52.4	61.4	92	6/12	36	0	11.8
Whetstone	51.7	61.3	91	6/9	28	0	12.2
LWW14-73915	51.5	57.6	95	6/9	28	0	10.9
IDO1101 (W)	51.5	62.0	96	6/12	26	0	11.0
UI Silver (W)	51.1	61.7	95	6/13	31	0	11.5
OR2130118H (W)	51.1	62.0	92	6/11	26	0	11.8
IDO1706 (W)	50.8	59.5	88	6/12	28	0	11.2
Utah 100	50.7	59.4	93	6/13	34	0	12.3
Promontory	50.7	62.2	96	6/10	30	0	11.8
AAC Wildfire	50.7	60.3	95	6/15	29	0	11.5
Loma	50.6	61.0	94	6/13	26	0	12.5
Sequoia	50.4	60.9	95	6/14	36	0	11.7
LCS Rocket	50.2	57.9	91	6/10	25	0	11.0
WB4623CLP	49.9	61.2	94	6/11	26	0	11.7
Irv (W)	49.5	59.4	94	6/11	27	0	11.9
Eltan (SWW)	49.3	58.9	87	6/15	28	0	11.3
MTF1435	49.2	59.9	95	6/12	35	0	12.1
OR2120358H	48.8	58.7	93	6/11	27	0	12.5
Juniper	48.8	61.1	94	6/12	38	0	13.2
IDO1607	48.5	57.2	96	6/14	25	0	11.7
Golden Spike (W)	47.9	60.0	96	6/12	32	0	11.6
Greenville	47.7	59.5	93	6/10	23	0	11.7
LCS Yeti (W)	47.2	61.8	95	6/9	27	0	12.5
Warhorse	46.8	60.9	95	6/12	27	0	13.4
Bearpaw	46.7	60.6	92	6/11	27	0	12.7
WA8294	46.3	58.6	91	6/10	27	0	12.2
SY Touchstone (W)	46.1	61.0	93	6/11	24	0	11.9
Norwest 553	44.1	60.6	79	6/13	26	0	12.1
WB4269	43.7	60.9	96	6/9	24	0	12.3
OR2130021R	41.1	59.9	85	6/13	25	0	12.7
Average	51.0	60.4	93	6/11	29	0	11.9
LSD (α = .05)	5.2	0.7	4.9	1.0	1.6	0.0	1.1
CV%	12.5	1.4	6.3	0.8	6.8	.	5.5
Pr >F	<.0001	<.0001	<.0001	<.0001	<.0001	.	<.0001

(W) = White
(SWW) = Soft White Winter

Table 8. Agronomic Data for Winter Wheat at Kimberly, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat									
IDO1706 (W)	---	---	142.4	61.7	93	5/25	38	0	10.1
XB4542	---	---	140.6	64.9	94	5/27	41	0	10.3
WA8252 (W)	164.5	133.1	136.5	63.1	95	5/29	40	0	9.2
Utah 100	163.0	136.9	134.2	62.1	91	5/30	42	0	10.2
WA8268	---	---	133.0	61.5	94	5/28	33	0	9.5
Keldin (QC)	---	141.7	130.2	64.1	94	5/27	36	0	10.7
LCS Jet	169.2	159.2	129.4	61.6	93	5/25	32	0	9.0
OR2130118H (W)	---	137.7	129.4	64.3	96	5/25	34	0	10.2
Irv (W)	161.1	131.7	125.0	63.0	96	5/26	35	0	9.3
LWW14-73915	---	---	124.9	61.7	96	5/23	32	0	9.8
Mandala	---	141.7	123.8	64.2	97	5/30	38	0	9.2
Keldin	162.2	151.9	122.8	64.0	93	5/26	36	0	9.3
LCS Rocket	---	147.5	121.6	61.1	93	5/23	34	0	9.3
SY Touchstone (W)	147.5	129.7	121.3	63.5	94	5/27	33	0	10.9
OR2120358H	---	---	121.0	62.8	96	5/27	34	0	10.1
AAC Wildfire	---	---	120.8	64.3	92	5/31	36	0	9.3
Norwest 553	162.3	135.6	120.8	62.3	94	5/27	32	0	10.2
WA8294	---	---	120.6	61.6	96	5/23	33	0	10.0
Yellowstone	166.5	139.1	120.6	63.2	93	5/28	40	0	9.6
Loma	166.5	145.1	120.6	63.2	92	5/30	37	0	10.0
Northern	157.8	147.5	120.3	62.8	96	5/29	38	0	9.7
MTF1432	---	---	118.8	61.7	92	5/31	42	0	9.1
Norwest 553/Yellowstone	---	154.6	118.4	62.8	94	5/26	38	0	10.1
Warhorse	140.3	127.1	117.8	63.9	93	5/27	38	0	11.1
Greenville	159.3	144.5	116.0	63.1	94	5/24	30	0	9.3
Whetstone	168.5	146.0	114.8	63.9	94	5/22	35	0	10.5
OR2130021R	---	137.1	113.5	62.7	92	5/30	35	0	10.3
WB4418	---	---	112.1	63.0	92	5/22	31	0	12.0
IDO1607	---	---	110.8	62.0	84	5/31	34	0	10.6
WB4311	---	---	110.0	64.2	97	5/23	32	0	11.3
Keldin + 11-52-0	---	137.1	109.8	63.7	89	5/26	34	0	9.2
WB4623CLP	---	130.6	106.6	64.1	92	5/26	37	0	10.6
IDO1101 (W)	158.6	133.2	105.5	63.9	95	5/26	32	0	10.5
Metropolis	---	126.1	100.5	64.2	95	5/22	32	0	13.3
MTF1435	---	---	99.3	62.4	96	5/26	47	0	11.2
WB4269	---	---	97.1	63.9	92	5/21	34	0	11.7
Rebelde	---	134.5	95.8	64.4	94	5/24	33	0	11.6
IDO1506 (W)	---	137.9	91.7	63.1	94	5/25	26	0	10.8
Average	156.9	136.1	118.8	63.1	94	5/26	35	0	10.2
LSD (α=.05)	14.7	22.9	23.3	0.7	6.0	1.5	2.8	0.0	
CV %	6.7	12.0	14.0	0.8	4.6	0.7	5.6	.	
Pr > F	0.0005	0.2537	0.0015	<.0001	0.2418	<.0001	<.0001	.	

(W) = White

Table 9. Agronomic Data for Winter Wheat at Rupert, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat									
Keldin (QC)	---	135.0	178.1	63.2	100	5/30	39	0	9.9
IDO1706 (W)	---	---	176.4	58.2	100	5/31	39	0	11.4
Keldin + 11-52-0	---	130.1	174.9	63.3	100	5/30	38	0	10.4
Yellowstone	88.1	140.3	169.7	61.7	100	6/2	40	0	10.2
IDO1101 (W)	87.9	129.0	169.0	61.3	100	5/31	36	0	10.8
LCS Jet	99.7	142.6	168.7	61.0	100	5/29	33	0	11.1
Keldin	103.4	156.4	167.0	63.1	100	5/30	37	0	10.8
Northern	76.0	125.8	159.4	61.2	100	6/2	41	0	11.0
WA8252 (W)	78.0	150.4	156.8	61.6	100	6/2	41	0	10.6
Whetstone	90.5	129.3	156.8	62.8	100	5/27	39	0	10.7
SY Touchstone (W)	97.0	117.6	156.7	62.2	100	6/2	34	0	10.5
Greenville	83.6	138.6	156.6	61.1	100	5/30	32	0	12.3
OR2130118H (W)	---	132.3	156.5	63.1	100	5/31	35	0	10.8
WA8268	---	---	154.8	60.0	100	6/1	33	0	11.3
Norwest 553/Yellowstone	---	134.9	152.9	61.0	100	5/31	40	0	11.4
XB4542	---	---	152.4	63.0	100	6/2	44	0	10.7
WB4418	---	---	152.0	62.0	100	5/26	38	0	10.5
Irv (W)	---	---	151.1	59.8	100	5/30	36	0	11.9
WB4269	---	---	150.7	63.5	100	5/26	37	0	10.2
LCS Rocket	---	136.1	150.3	59.9	100	5/29	34	0	9.6
Utah 100	70.4	138.1	149.9	60.1	100	6/3	41	0	10.9
WA8294	---	---	149.1	60.5	100	5/30	32	0	10.6
OR2130021R	---	124.7	148.9	61.7	98	6/2	35	0	10.8
LWW14-73915	---	---	148.2	59.9	100	5/29	37	0	10.3
Loma	88.8	137.5	147.5	61.5	100	6/3	39	0	11.9
Mandala	---	118.7	145.8	62.9	100	6/3	40	0	11.2
IDO1506 (W)	---	117.5	144.6	59.8	100	5/31	27	0	10.8
IDO1607	---	---	144.5	60.1	100	6/4	38	0	12.1
WB4311	---	---	143.3	63.4	100	5/28	34	0	11.8
Warhorse	63.4	135.8	141.8	62.5	100	6/2	39	0	11.7
AAC Wildfire	---	---	140.3	61.6	100	6/4	38	0	11.0
Metropolis	---	127.9	139.9	63.0	100	5/30	35	0	12.3
OR2120358H	---	---	139.8	61.3	100	6/1	36	0	12.0
Norwest 553	94.5	129.1	139.3	60.5	99	6/1	34	0	11.5
MTF1432	---	---	138.3	60.8	100	6/4	44	0	11.7
WB4623CLP	---	127.4	135.9	63.1	100	6/1	41	0	13.2
MTF1435	---	---	132.8	60.6	100	6/2	47	0	12.4
Rebelde	---	129.5	131.2	63.1	100	5/30	33	0	13.1
Average	83.7	131.3	152.3	61.6	100	5/31	37	0	11.2
LSD (α=.05)	11.3	24.9	13.4	0.9	0.7	1.3	2.6	0.0	
CV %	9.6	13.6	6.3	1.0	0.5	0.6	5.0	.	
Pr > F	<.0001	0.215	<.0001	<.0001	<.0001	<.0001	<.0001	.	

(W) = White

Table 10. Agronomic Data for Winter Wheat at Aberdeen, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat									
XB4542	---	---	183.3	61.9	96	6/2	45	1	10.9
OR2130118H (W)	---	160.6	180.6	61.7	94	5/31	37	13	12.2
Yellowstone	109.4	162.9	177.2	59.8	94	6/1	41	21	12.8
WB4418	---	---	176.9	62.0	93	5/26	36	0	11.1
Keldin	102.4	162.5	176.9	62.3	95	5/31	39	10	11.7
Utah 100	107.1	154.7	176.6	60.0	95	6/2	47	0	12.4
WA8268	---	---	175.8	57.7	94	6/2	35	0	12.2
Norwest 553/Yellowstone	---	167.5	175.7	60.5	94	6/1	42	0	12.5
LCS Jet	165.4	151.1	175.1	59.8	95	5/28	35	0	11.5
Keldin (QC)	---	155.6	174.3	61.6	95	5/31	37	11	12.1
IDO1706 (W)	---	---	173.0	57.3	95	5/30	41	20	12.3
WA8252 (W)	121.0	168.4	172.2	60.9	95	6/3	44	26	12.2
Northern	106.8	151.3	170.2	59.6	95	6/2	42	23	12.4
LWW14-73915	---	---	169.6	57.6	95	5/28	36	0	12.1
OR2130021R	---	152.0	169.2	61.0	95	6/1	38	0	12.2
Whetstone	106.6	142.9	169.1	60.8	93	5/27	38	1	13.1
WA8294	---	---	169.0	59.0	93	5/29	34	0	12.3
Irv (W)	137.3	142.5	168.0	59.0	94	5/30	38	0	12.2
WB4311	---	---	167.6	62.6	95	5/28	35	0	11.9
Keldin + 11-52-0	---	151.2	163.4	61.9	95	6/1	37	28	12.2
IDO1101 (W)	106.2	139.5	163.3	61.0	95	6/1	39	6	12.5
WB4269	---	---	161.9	62.2	94	5/26	36	0	11.0
LCS Rocket	---	136.1	160.7	57.5	95	5/29	35	0	12.0
SY Touchstone (W)	142.2	153.0	160.2	60.8	95	6/2	36	0	12.7
AAC Wildfire	---	---	160.0	61.4	94	6/6	44	7	12.9
Greenville	110.0	138.9	159.8	58.4	94	5/30	33	0	12.6
Loma	165.4	135.7	157.8	59.6	93	6/2	40	28	13.0
WB4623CLP	---	147.0	156.3	62.7	95	6/2	40	17	14.0
MTF1432	---	---	145.0	58.1	95	6/2	44	64	13.3
OR2120358H	---	---	144.1	58.4	95	6/3	37	33	13.8
Norwest 553	150.0	139.8	143.6	59.8	91	6/2	36	0	12.8
MTF1435	---	---	142.6	59.7	94	6/2	47	3	13.0
Warhorse	114.5	140.2	141.3	61.5	95	6/2	43	1	14.3
IDO1607	---	---	141.1	58.2	95	6/6	39	28	13.5
Sequoia	---	---	131.9	60.4	95	6/7	47	90	14.5
IDO1506 (W)	---	126.5	130.5	57.2	95	5/31	29	19	12.7
Average	112.9	147.2	162.9	60.1	94	5/31	39	12	12.5
LSD (α=.05)	13.5	19.0	15.7	1.0	2.3	2.3	2.7	22.8	
CV %	8.5	7.9	6.8	1.2	1.8	1.1	4.9	131.2	
Pr > F	<.0001	0.0013	<.0001	<.0001	0.0399	<.0001	<.0001	<.0001	

(W) = White

Table 11. Agronomic Data for Winter Wheat at Rexburg, Irrigated, 2018.

Variety	Yield (bu/A) 2018	Combine Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat							
Northern	158.8	62.9	100	6/5	38	0	13.6
MTF1432	158.0	56.0	100	6/5	44	0	14.3
WA8252 (W)	154.5	61.4	100	6/4	45	0	14.0
Norwest 553/Yellowstone	152.9	62.0	100	6/4	39	0	13.7
IDO1706 (W)	152.6	55.8	100	6/2	41	0	14.3
XB4542	152.3	63.7	100	6/3	41	0	12.8
Mandala	151.9	65.3	100	6/5	39	0	13.7
AAC Wildfire	149.8	58.6	100	6/4	38	0	13.6
Utah 100	149.3	60.5	100	6/4	45	0	14.2
Yellowstone	149.2	59.7	100	6/4	38	0	13.5
Loma	149.1	62.7	100	6/5	38	0	13.6
Keldin (QC)	146.4	67.7	100	6/3	43	0	12.8
WA8294	146.2	57.9	100	6/4	38	0	13.9
OR2130118H (W)	144.2	58.9	100	6/2	39	0	14.9
IDO1101 (W)	143.7	61.6	100	6/5	37	0	13.8
LWW14-73915	141.2	61.7	100	6/5	39	0	13.8
Keldin + 11-52-0	141.0	66.4	100	6/5	41	0	14.8
LCS Jet	139.0	61.6	100	6/5	39	0	13.9
Norwest 553	139.0	52.6	100	6/5	39	0	13.8
Whetstone	135.8	64.3	100	6/3	40	0	13.6
Warhorse	135.5	62.5	100	6/4	38	0	13.9
SY Touchstone (W)	134.7	64.8	100	6/4	46	0	14.4
OR2130021R	133.9	63.1	100	6/2	41	0	14.5
WB4623CLP	132.5	62.4	100	6/3	39	0	13.6
MTF1435	131.8	60.2	100	6/2	41	0	14.5
Keldin	131.0	67.3	100	6/3	42	0	13.2
OR2120358H	122.7	61.7	100	6/5	42	0	14.1
Irv (W)	120.3	57.2	100	6/3	41	0	12.7
IDO1607	119.7	60.7	100	6/5	38	0	13.4
WB4418	117.8	63.6	100	6/2	46	0	14.5
WB4269	117.3	67.6	100	6/4	38	0	14.0
IDO1506 (W)	113.4	62.2	100	6/5	38	0	14.0
Metropolis	112.8	63.4	100	6/5	40	0	13.7
LCS Rocket	111.8	62.2	100	6/5	40	0	13.7
WB4311	110.3	63.1	100	6/4	38	0	13.9
Greenville	102.9	61.2	100	6/4	39	0	13.5
Rebelde	100.7	63.9	100	6/5	48	0	13.4
Average	135.0	61.9	100	6/3	41	0	13.9
LSD (α=.05)	20.8	3.8	0.0	0.0	0.0	0.0	0.02
CV %	11.0	4.4	0.0	0.0	0.0	.	0.08
Pr > F	<.0001	<.0001	.	<.0001	<.0001	.	<.0001

(W) = White

Table 12. Agronomic Data for Winter Wheat at Ririe, Dryland, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat									
LCS Jet	47.8	26.0	61.2	59.0	93	6/12	25	0	11.6
UI SRG	45.3	36.0	56.1	61.7	96	6/14	32	0	12.9
LWW14-73915	---	---	55.3	59.2	95	6/9	28	0	11.2
MTF1432	---	---	54.6	60.0	99	6/16	34	0	12.4
LCS Rocket	---	38.2	54.5	59.1	100	6/11	24	0	11.5
Yellowstone	45.5	30.3	54.3	62.6	99	6/12	28	0	12.9
Lucin-CL	40.9	31.4	53.6	62.4	93	6/13	34	0	12.3
Eltan (SWW)	42.3	40.7	53.3	60.8	81	6/18	29	0	11.2
Keldin	50.8	27.9	53.0	62.6	91	6/12	28	0	11.8
Deloris	42.4	36.6	52.9	63.0	99	6/14	34	0	12.2
Curlew	48.5	34.7	52.6	62.9	96	6/12	31	0	12.5
XB4542	---	---	52.6	63.2	89	6/12	31	0	12.1
WB4623CLP	---	30.7	52.1	62.5	96	6/12	27	0	13.8
SY Clearstone 2CL	49.4	33.9	52.0	62.2	96	6/11	30	0	12.0
IDO1607	---	---	51.7	59.3	98	6/17	25	0	11.7
Whetstone	41.7	29.4	51.7	62.7	91	6/10	27	0	12.8
Utah 100	43.2	37.9	51.7	61.3	94	6/14	34	0	12.2
Loma	39.1	31.1	51.4	62.6	99	6/14	25	0	13.0
WB4311	---	---	51.4	63.2	88	6/10	26	0	12.0
WB4418	---	---	51.1	62.7	93	6/9	26	0	11.7
Juniper	43.4	38.4	50.9	62.0	96	6/13	37	0	14.8
IDO1706 (W)	---	---	50.7	61.7	100	6/14	28	0	11.7
Keldin + 11-52-0	---	30.0	50.5	63.2	100	6/10	27	0	10.4
LCS Yeti (W)	48.3	26.5	50.1	63.4	99	6/7	26	0	12.1
Northern	44.6	30.9	50.0	62.6	94	6/14	29	0	13.4
UICF Grace (W)	40.8	34.1	50.0	61.7	99	6/12	35	0	11.9
UI Silver (W)	46.6	37.7	50.0	63.5	95	6/15	32	0	12.3
Norwest 553/Yellowstone	---	29.8	49.7	62.5	95	6/12	31	0	12.1
IDO1101 (W)	44.8	29.6	49.6	63.1	99	6/14	25	0	11.5
Irv (W)	40.6	25.8	49.4	60.3	94	6/13	27	0	13.4
SY Touchstone (W)	37.5	31.7	49.0	62.4	96	6/12	25	0	13.1
MTF1435	---	---	48.5	61.0	100	6/13	35	0	12.3
Promontory	42.9	33.6	48.4	64.0	96	6/10	29	0	11.5
Golden Spike (W)	45.8	35.1	47.5	61.7	100	6/13	32	0	11.9
Keldin (QC)	---	28.4	47.4	63.3	96	6/12	28	0	11.9
Bearpaw	31.8	24.1	46.8	62.9	99	6/12	27	0	11.7
AAC Wildfire	---	---	46.6	61.6	97	6/17	29	0	12.1
Sequoia	---	---	46.5	62.4	100	6/17	35	0	12.3
OR2120358H	---	---	46.5	60.5	96	6/13	28	0	13.0
OR2130021R	---	33.2	45.6	61.8	94	6/15	26	0	13.5
OR2130118H (W)	---	27.7	45.4	63.5	94	6/13	26	0	12.5
Greenville	39.5	25.3	45.1	62.3	96	6/11	22	0	11.9
Norwest 553	39.0	33.2	44.9	61.6	94	6/14	25	0	13.0
Warhorse	36.4	30.2	44.8	62.1	99	6/14	26	0	14.4
WA8294	---	---	44.5	59.8	98	6/12	27	0	12.8
WB4269	---	---	43.1	62.8	100	6/9	23	0	13.6
Average	42.1	30.7	50.2	62.0	96	6/13	28	0	12.4
LSD (α=.05)	7.0	7.6	8.5	0.6	9.1	2.4	3.3	0.0	
CV %	11.8	17.6	12.1	0.7	6.8	1.0	8.4	.	
Pr > F	<.0001	<.0001	0.0964	<.0001	0.1329	<.0001	<.0001	.	

(W) = White
(SWW) = Soft White Winter

Table 13. Agronomic Data for Winter Wheat at Rockland, Dryland, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat									
UICF Grace (W)	50.5	49.7	45.6	61.5	93	5/31	34	0	10.4
LCS Jet	61.3	59.9	45.4	60.2	91	6/1	23	0	9.9
Sequoia	---	---	44.6	62.8	90	6/4	31	0	9.3
OR2130118H (W)	---	38.3	44.3	63.5	91	6/1	26	0	9.6
SY Clearstone 2CL	46.7	47.2	43.7	62.5	92	5/31	30	0	10.9
Keldin + 11-52-0	---	47.8	43.2	62.9	93	5/31	28	0	8.2
Deloris	32.8	40.0	42.6	62.7	91	6/2	30	0	10.0
UI SRG	52.0	43.7	42.4	62.1	93	6/1	32	0	10.4
OR2120358H	---	---	41.3	61.1	92	6/1	25	0	10.5
XB4542	---	---	41.0	63.7	91	6/1	30	0	8.4
Norwest 553/Yellowstone	---	39.1	40.8	62.2	92	6/1	27	0	9.2
WB4311	---	---	40.6	62.8	91	6/1	26	0	10.4
WA8294	---	---	40.2	61.1	91	6/1	26	0	10.9
Utah 100	56.0	46.5	39.7	61.5	91	6/2	32	0	10.7
IDO1706 (W)	---	---	39.6	61.3	92	6/1	29	0	8.9
Lucin-CL	32.6	40.9	39.5	62.8	90	6/2	32	0	10.0
Whetstone	---	33.9	39.4	63.0	92	5/31	28	0	10.6
Curlew	46.5	44.1	38.6	63.2	89	6/1	29	0	10.2
Yellowstone	48.3	47.4	38.6	62.6	88	6/1	27	0	10.0
Norwest 553	54.6	33.9	38.1	62.2	87	6/2	24	0	9.8
Keldin (QC)	---	46.0	37.9	63.0	93	5/31	27	0	9.3
IDO1607	---	---	37.8	59.4	92	6/2	23	0	9.4
AAC Wildfire	---	---	37.7	61.9	92	6/5	25	0	9.3
MTF1435	---	---	37.6	61.9	86	6/1	31	0	10.1
LWW14-73915	---	---	37.6	60.5	91	6/1	27	0	9.2
Keldin	48.1	52.1	37.4	62.9	93	6/1	27	0	9.7
UI Silver (W)	53.6	41.9	37.3	63.0	92	6/2	27	0	9.0
Warhorse	40.5	36.4	37.1	62.6	89	6/1	24	0	12.6
Irv (W)	53.1	43.7	37.1	62.0	91	6/1	26	0	9.5
MTF1432	---	---	36.8	61.2	90	6/3	28	0	10.5
Northern	44.8	45.8	36.8	62.4	90	6/2	25	0	9.5
LCS Rocket	---	44.7	36.7	60.2	87	6/1	24	0	9.0
Loma	38.7	40.9	36.1	62.5	89	6/2	26	0	10.6
IDO1101 (W)	47.4	46.1	35.3	63.4	89	6/1	25	0	8.8
Greenville	42.7	34.6	35.0	61.5	90	6/1	22	0	10.2
SY Touchstone (W)	---	---	34.5	63.1	91	6/2	24	0	9.7
Promontory	48.3	41.4	33.9	63.8	93	5/31	27	0	10.7
WB4623CLP	---	36.3	33.6	62.3	90	6/1	24	0	8.2
Juniper	50.5	45.2	33.5	62.6	89	6/1	35	0	10.3
Golden Spike (W)	41.9	41.7	33.1	61.9	90	6/2	28	0	9.7
Eltan (SWW)	33.1	47.6	32.8	61.3	90	6/5	25	0	9.6
Bearpaw	21.4	35.2	30.8	62.0	90	5/31	25	0	12.0
OR2130021R	---	39.4	29.7	62.2	91	6/2	23	0	10.8
WB4269	---	---	24.9	62.1	93	6/1	24	0	11.5
LCS Yeti (W)	46.1	37.5	23.7	62.7	90	5/31	25	0	11.9
Average	43.3	41.8	37.7	62.2	91	6/1	27	0	10.0
LSD (a=.05)	6.4	7.6	7.7	0.5	4.6	0.7	2.1	0.0	
CV %	10.6	13.1	14.5	0.5	3.6	0.3	5.6	.	
Pr >F	<.0001	<.0001	<.0001	<.0001	0.4760	<.0001	<.0001	.	

(W) = White
(SWW) = Soft White Winter

Table 14. Agronomic Data for Winter Wheat at Soda Springs, Dryland, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat									
Keldin + 11-52-0	---	90.3	79.5	58.4	99	6/20	30	0	12.1
Yellowstone	101.1	87.7	78.8	57.9	97	6/20	34	0	13.4
Keldin (QC)	---	79.5	75.0	58.0	98	6/21	31	0	12.4
XB4542	---	---	74.1	57.9	97	6/20	34	0	12.3
WB4311	---	---	73.7	59.7	95	6/18	27	0	13.6
Keldin	103.2	68.3	73.5	58.2	99	6/21	31	0	12.7
MTF1432	---	---	73.4	56.9	99	6/22	37	0	12.5
Norwest 553/Yellowstone	---	88.7	73.3	58.2	97	6/21	31	0	13.0
Northern	78.5	71.2	72.9	58.4	92	6/22	30	0	12.9
Curlew	---	88.4	70.9	56.4	96	6/20	36	0	13.7
LCS Jet	---	76.6	70.4	55.9	99	6/21	28	0	12.0
SY Clearstone 2CL	97.2	88.7	70.2	57.3	97	6/21	33	0	13.5
Promontory	---	82.0	69.8	58.8	99	6/19	33	0	13.1
UI SRG	---	89.5	69.8	57.0	99	6/21	40	0	12.7
IDO1101 (W)	101.1	97.1	69.7	59.4	99	6/20	28	0	12.8
WB4418	---	---	68.8	58.3	92	6/17	28	0	12.4
Deloris	---	88.3	68.6	58.8	98	6/22	39	0	13.5
LCS Yeti (W)	97.1	60.0	67.9	59.4	96	6/19	31	0	13.4
AAC Wildfire	---	---	67.7	57.4	98	6/23	33	0	13.2
UI Silver (W)	91.1	80.3	66.1	58.7	97	6/22	34	0	13.1
Loma	92.4	58.0	64.1	58.0	96	6/22	26	0	13.7
Whetstone	---	52.0	64.1	58.3	91	6/18	29	0	13.3
Lucin-CL	---	82.4	64.1	59.0	94	6/22	41	0	13.2
WB4623CLP	---	74.8	64.0	58.7	97	6/20	28	0	13.0
OR2130118H (W)	---	66.7	63.5	58.9	92	6/21	26	0	13.5
WB4269	---	---	63.1	57.9	96	6/18	24	0	11.8
Golden Spike (W)	---	87.9	63.0	56.4	99	6/23	37	0	13.3
Greenville	79.6	59.1	62.9	54.8	94	6/19	24	0	12.8
Bearpaw	---	60.3	62.6	56.9	88	6/20	29	0	14.4
Juniper	---	60.5	62.1	58.7	97	6/22	44	0	14.6
IDO1706 (W)	---	---	62.0	55.4	71	6/22	29	0	13.0
Irv (W)	97.5	64.4	62.0	55.9	96	6/20	28	0	12.9
Eltan (SWW)	---	88.5	61.9	54.4	91	6/23	30	0	13.1
UICF Grace (W)	---	81.1	61.7	56.7	98	6/21	42	0	14.2
LWW14-73915	---	---	61.6	53.1	98	6/19	30	0	12.2
MTF1435	---	---	61.4	56.9	98	6/21	40	0	13.9
Utah 100	83.8	59.6	60.8	55.4	96	6/22	36	0	14.2
Sequoia	---	---	60.1	57.5	96	6/23	41	0	13.7
LCS Rocket	---	79.4	59.6	54.4	86	6/19	27	0	12.3
OR2120358H	---	---	58.7	54.4	92	6/20	28	0	13.8
Warhorse	98.3	64.5	58.5	57.9	97	6/20	30	0	13.4
IDO1607	---	---	55.9	53.1	99	6/23	28	0	14.1
SY Touchstone (W)	---	52.4	55.0	57.5	90	6/21	25	0	13.0
WA8294	---	---	54.2	54.9	84	6/19	28	0	12.9
Norwest 553	99.8	50.1	49.3	58.0	56	6/22	28	0	13.7
OR2130021R	---	57.1	48.1	55.6	70	6/22	26	0	13.8
Average	91.1	72.2	65.2	57.2	93	6/21	31	0.0	13.2
LSD (α=.05)	12.7	23.9	10.4	1.9	10.1	1.7	2.6	0.0	
CV %	8.4	23.7	11.4	2.4	7.7	0.7	5.9	.	
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	.	

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

Table 15. Hard Winter Wheat Yield Percentage of Location Averages, 2018.

	(100% =Average)							Variety
Variety	**Kimberly**	**Aberdeen**	**Rupert**	**Rexburg**	**Ririe**	**Rockland**	**Soda Springs**	**Average**
LCS Jet	109	107	111	103	122	120	108	111
UI SRG	---	---	---	---	112	112	107	110
XB4542	118	113	100	113	105	109	114	110
WA8252 (W)	115	106	103	114	---	---	---	109
Yellowstone	102	109	111	111	108	102	121	109
SY Clearstone 2CL	---	---	---	---	103	116	108	109
IDO1706 (W)	120	106	116	113	101	105	95	108
Deloris	---	---	---	---	105	113	105	108
Keldin (QC)	110	107	117	108	94	100	115	107
WA8268	112	108	102	---	---	---	---	107
Keldin + 11-52-0	92	100	115	104	100	114	122	107
Norwest 553/Yellowstone	100	108	100	113	99	108	112	106
Curlew	---	---	---	---	105	102	109	105
Northern	101	104	105	118	100	98	112	105
Keldin	103	109	110	97	105	99	113	105
UICF Grace (W)	---	---	---	---	100	121	95	105
OR2130118H (W)	109	111	103	107	90	117	97	105
Utah 100	113	108	98	111	103	105	93	105
Mandala	104	---	96	113	---	---	---	104
Lucin-CL	---	---	---	---	107	105	98	103
MTF1432	100	89	91	117	109	98	113	102
LWW14-73915	105	104	97	105	110	100	95	102
Whetstone	97	104	103	101	103	104	98	101
IDO1101 (W)	89	100	111	106	99	94	107	101
Loma	101	97	97	110	102	96	98	100
AAC Wildfire	102	98	92	111	93	100	104	100
UI Silver (W)	---	---	---	---	99	99	101	100
WB4418	94	109	100	87	102	---	105	100
WB4311	93	103	94	82	102	108	113	99
WA8294	102	104	98	108	89	107	83	99
Irv (W)	105	103	99	89	98	98	95	98
Promontory	---	---	---	---	96	90	107	98
LCS Rocket	102	99	99	83	108	97	91	97
SY Touchstone (W)	102	98	103	100	97	91	84	97
Sequoia	---	81	---	---	93	118	92	96
Eltan (SWW)	---	---	---	---	106	87	95	96
Juniper	---	---	---	---	101	89	95	95
OR2120358H	102	88	92	91	92	109	90	95
WB4623CLP	90	96	89	98	104	89	98	95
Warhorse	99	87	93	100	89	98	90	94
Greenville	98	98	103	76	90	93	96	93
IDO1607	93	87	95	89	103	100	86	93
Golden Spike (W)	---	---	---	---	95	88	97	93
Norwest 553	102	88	91	103	89	101	76	93
MTF1435	84	88	87	98	97	100	94	92
OR2130021R	96	104	98	99	91	79	74	91
Bearpaw	---	---	---	---	93	82	96	90
LCS Yeti (W)	---	---	---	---	100	63	104	89
WB4269	82	99	99	87	86	66	97	88
Metropolis	85	---	92	84	---	---	---	87
IDO1506 (W)	77	80	95	84	---	---	---	84
Rebelde	81	---	86	75	---	---	---	80
Location Average (bu/A)	119	163	152	135	50	38	65	

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

2018 Hard Winter Wheat Yield Percentage Across All Locations

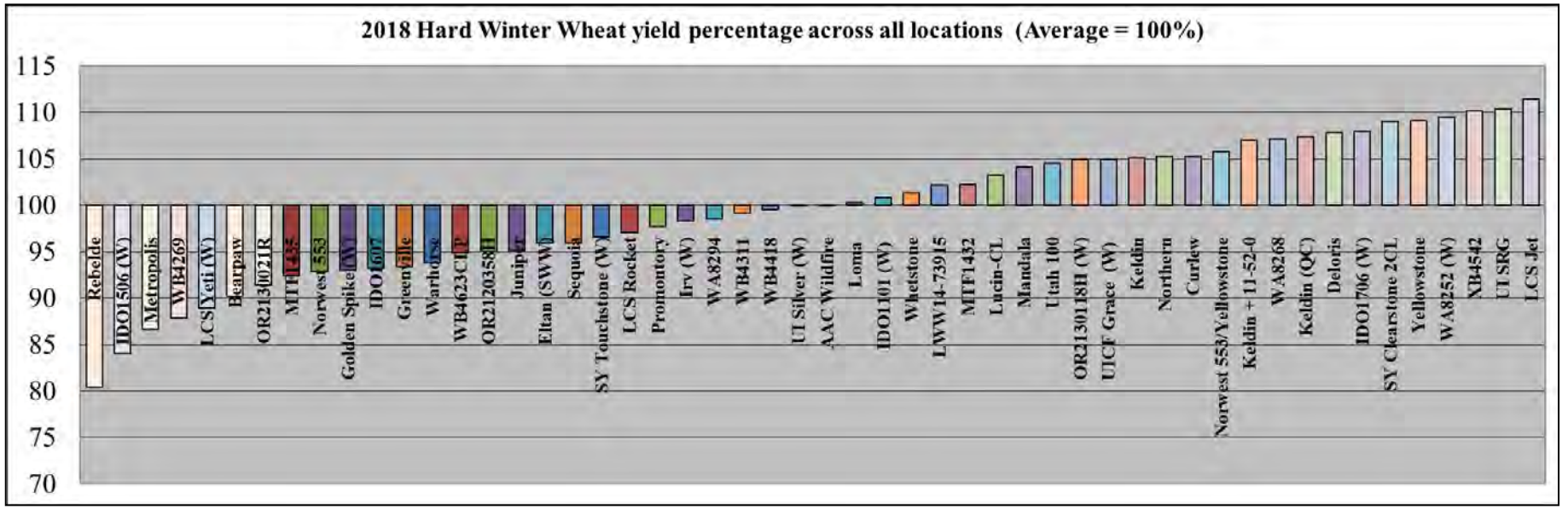


Chart 2. Hard Winter Wheat Yield Percentage Across All Locations.

Table 16. Soft White Winter Wheat Irrigated Nurseries, 3-Year Averages (2016-2018; 10 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
WB1783	143.7	61.9	97	5/28	37	2	9.6
Bruneau	140.4	59.7	95	5/31	38	10	9.0
SY Ovation	139.5	59.7	96	5/28	37	6	9.0
LCS Hulk	138.1	60.3	95	5/28	36	4	9.5
Bobtail	137.5	57.7	94	5/29	36	8	9.5
WB1529	135.4	62.1	97	5/28	36	5	9.7
Jasper	134.2	58.3	96	5/30	38	4	9.8
SY Assure	134.2	60.9	96	5/24	35	6	9.5
IDN07-28017B	132.7	60.5	97	5/27	36	5	9.3
UI Castle CL+	132.4	60.2	95	5/31	38	12	9.9
Norwest Tandem	131.2	59.7	95	5/26	35	2	9.6
UI Sparrow	130.3	57.9	93	6/1	40	9	9.7
LCS Drive	129.8	58.3	95	5/25	32	1	9.2
LCS Artdeco	128.6	58.9	95	5/26	35	4	8.8
UI Magic CL+	126.4	60.4	94	5/27	35	4	9.4
WB 456	125.9	61.9	96	5/25	35	4	9.7
Stephens	123.6	58.9	96	5/28	36	6	9.6
WB1376CLP	123.1	62.5	96	5/27	37	0	10.3
Brundage	118.7	59.9	96	5/26	37	2	9.7
Average	131.9	60.0	95	5/28	36	5	9.5
LSD (α =.05)	6.5	0.4	2.9	0.7	0.9	3.3	0.5
CV%	11.2	1.5	6.9	1.0	5.8	153.3	6.1
Pr > F	<.0001	<.0001	0.6378	<.0001	<.0001	<.0001	<.0001

Table 17. Soft White Winter Wheat Dryland Nurseries, 3-Year Averages (2016-2018; 8 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
WB1783	63.5	61.0	96	6/14	27	0	11.0
UI Sparrow	63.1	58.1	93	6/15	30	0	9.8
LCS Hulk	61.2	59.1	93	6/12	27	0	10.5
Otto	61.0	59.1	90	6/18	28	0	11.2
Bruneau	60.8	59.2	92	6/17	27	0	10.3
Norwest Tandem	60.2	59.1	93	6/11	25	0	10.1
Eltan	60.1	59.6	94	6/18	28	0	10.8
Jasper	57.3	56.5	94	6/13	27	0	10.4
WB1376CLP	57.2	61.3	90	6/13	28	0	12.5
UI Castle	55.6	59.3	93	6/15	27	0	11.1
UI Magic	53.6	59.4	91	6/11	25	0	10.8
Bobtail	53.0	55.9	93	6/12	24	0	9.4
Stephens	51.9	57.5	92	6/13	26	0	11.1
Norwest Duet	50.2	58.9	89	6/12	29	0	10.3
Brundage	37.9	61.4	83	6/6	24	0	9.9
Average	56.4	59.0	92	6/13	27	0	10.6
LSD (α =.05)	5.2	0.7	5.9	1.0	1.1	0.0	0.9
CV%	15.4	1.9	10.7	1.0	6.8	.	7.0
Pr > F	<.0001	<.0001	0.9913	<.0001	<.0001	.	<.0001

Table 18. Irrigated Soft White Winter Wheat Data Combined from Kimberly, Rupert, Aberdeen, and Rexburg, 2018.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
UIL15-72223	155.0	60.3	97	5/29	39	0	8.5
UI Sparrow (QC)	154.6	58.6	97	5/31	41	2	9.3
LWW14-74143	154.2	57.8	98	5/26	38	0	8.6
WB1783	153.5	61.8	97	5/28	38	0	9.1
SY Ovation	151.1	60.2	98	5/28	38	0	8.3
Bruneau	150.5	60.2	97	5/30	39	4	8.5
SY Dayton	150.5	60.2	96	5/28	37	0	8.4
UIL14-75044	150.0	59.2	94	5/31	37	1	9.1
UI Magic CL+	148.2	60.9	98	5/27	36	0	8.9
Jasper	147.9	59.9	97	5/29	38	0	9.1
IDO1005	146.6	60.5	96	5/30	38	0	9.1
UI Sparrow	146.3	58.6	96	5/31	42	1	9.2
WB1529	146.1	62.3	99	5/28	37	0	9.1
IDO1708	145.9	58.9	98	5/26	37	3	8.2
LCS Hulk	145.3	61.5	97	5/29	37	0	8.5
OR2101043	144.8	60.4	97	5/28	38	0	9.1
IDN10-08606A	144.7	59.9	96	5/30	40	3	8.7
IDN09-15702A	143.3	60.5	97	5/28	39	0	9.3
UI Castle CL+	143.2	60.6	96	5/30	39	8	9.7
LCS Shark	142.9	59.1	95	5/26	37	0	9.3
Rosalyn	141.7	58.3	97	5/29	38	0	8.7
Brundage	139.7	61.3	99	5/26	38	0	9.1
OR2121086	139.0	59.9	97	5/29	39	0	8.8
IDN07-28017B	137.9	60.8	98	5/26	38	0	9.2
WA8232	137.8	61.6	96	5/30	38	0	8.1
Bobtail	137.5	58.3	95	5/29	36	0	9.2
LWW14-72916	137.2	60.7	96	5/25	33	0	8.7
Stephens	136.4	58.7	96	5/28	37	0	9.0
SY Assure	135.8	61.4	97	5/24	35	0	9.0
Norwest Tandem	135.2	59.8	97	5/26	35	0	9.1
OR2121285	134.3	60.2	94	5/29	35	0	9.2
LCS Artdeco	134.2	59.8	97	5/25	35	0	8.3
XA1801	133.5	61.3	98	5/27	36	0	8.3
WB1604	133.1	60.9	95	5/27	36	0	9.3
XB1104	130.6	62.4	98	5/25	33	0	8.9
WB 456	129.4	62.7	98	5/25	37	0	9.3
WB1376CLP	126.7	63.0	97	5/27	39	0	10.0
LCS Drive	124.5	58.2	98	5/25	32	2	9.1
ORI2150031Cl+	120.5	60.2	97	5/28	39	0	9.1
ORI2150061Cl+	117.5	61.8	94	5/26	37	0	10.3
Average	140.7	60.3	97	5/28	37	1	9.0
LSD (α = .05)	10.9	0.5	3.5	0.9	1.1	2.6	0.7
CV %	11.0	1.1	5.2	0.9	4.2	620.0	5.5
Pr > F	<.0001	<.0001	0.3868	<.0001	<.0001	<.0001	<.0001

Table 19. Dryland Soft White Winter Wheat Data Combined from Ririe, Soda Springs, and Rockland, 2018.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Bruneau	68.2	59.3	86	6/19	29	0	10.9
Eltan	68.1	58.5	93	6/21	33	0	12.7
WB1783	66.6	60.5	86	6/17	29	0	11.9
WB1529	64.3	60.0	97	6/16	26	0	12.1
UI Sparrow	63.2	58.3	91	6/14	31	0	10.4
Otto	63.1	57.8	82	6/21	30	0	12.9
WA8271	62.5	61.3	88	6/15	27	0	11.2
WB1376CLP	61.8	60.2	83	6/16	29	0	13.3
XA1801	61.3	58.8	98	6/17	26	0	12.2
IDN10-08606A	61.1	58.8	93	6/14	29	0	11.1
LWW14-72916	60.6	57.8	93	6/11	24	0	10.2
OR2121086	60.4	58.1	86	6/17	29	0	11.9
Rosalyn	59.9	56.4	84	6/19	28	0	11.4
XB1104	59.6	59.5	95	6/13	24	0	11.9
WB1604	59.5	58.9	94	6/15	27	0	11.9
OR2121285	58.3	56.5	84	6/19	27	0	13.2
ORI2150031Cl+	58.2	57.6	84	6/18	29	0	12.9
LCS Hulk	57.8	59.2	90	6/12	27	0	11.3
IDN07-28017B	57.0	60.6	92	6/11	28	0	10.3
SY Banks	56.4	57.6	88	6/14	29	0	10.7
Norwest Tandem	56.0	59.0	91	6/11	25	0	10.1
UIL14-75044	55.8	57.5	85	6/13	26	0	11.2
Stephens	55.8	56.7	90	6/16	27	0	11.9
UIL15-72223	55.0	58.1	87	6/11	28	0	10.8
OR2101043	54.9	57.8	87	6/18	27	0	11.7
UI Magic CL+	54.6	59.9	86	6/11	26	0	11.4
ORI2150061Cl+	54.1	60.2	86	6/15	27	0	13.0
Norwest Duet	54.0	58.2	84	6/13	31	0	11.0
Jasper	53.5	56.4	92	6/13	28	0	11.6
LWW14-73161	53.4	58.7	89	6/12	29	0	11.0
IDO1708	51.9	57.3	91	6/10	28	0	10.5
IDO1005	51.0	59.5	95	6/13	28	0	11.7
SY Command	50.9	57.5	88	6/13	26	0	10.1
UI Castle CL+	49.9	58.9	91	6/14	28	0	12.1
IDN09-15702A	49.8	59.3	89	6/12	27	0	11.4
Average	57.1	58.6	88	6/14	28	0	11.5
LSD (α = .05)	6.3	1.0	13.8	1.1	1.5	0.0	1.2
CV%	11.9	1.9	16.8	0.7	5.9	.	6.0
Pr >F	<.0001	<.0001	0.5124	<.0001	<.0001	.	0.0054

Table 20. Agronomic Data for Winter Wheat at Kimberly, Irrigated, 2018.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	2016	2017	2018	(lb/bu)	Stand%	Date	(in.)	(%)	(%)
Soft White Winter Wheat									
UIL14-75044	---	---	150.1	60.4	91	5/30	36	0	8.6
UI Sparrow	152.6	98.9	148.2	59.6	96	5/31	39	0	8.4
Bruneau	148.9	140.4	141.7	61.1	96	5/31	38	0	8.0
UI Sparrow (QC)	---	127.1	139.0	59.6	92	5/31	38	0	8.9
OR2101043	---	143.4	137.0	61.1	94	5/29	37	0	8.6
WB1529	144.8	105.3	136.8	62.8	97	5/26	35	0	8.7
LCS Hulk	---	130.0	136.7	62.2	93	5/30	35	0	8.0
UIL15-72223	---	---	136.7	60.8	96	5/26	37	0	7.9
WB1783	146.6	110.3	135.4	62.8	94	5/28	35	0	8.8
Rosalyn	---	---	135.3	59.3	96	5/30	36	0	7.7
IDN07-28017B	138.0	128.1	131.7	61.7	95	5/24	37	0	9.0
LWW14-74143	---	---	131.3	59.1	95	5/27	37	0	8.5
IDN10-08606A	---	---	130.9	60.4	94	5/31	38	0	8.0
Stephens	136.9	99.5	129.3	59.7	97	5/27	36	0	7.9
WA8232	171.9	110.5	128.7	62.2	88	5/31	36	0	8.0
IDO1005	---	---	127.8	60.7	89	5/31	35	0	9.4
XB1104	---	---	126.3	63.2	97	5/23	30	0	9.0
SY Assure	149.2	124.6	124.9	62.4	93	5/23	33	0	9.1
LCS Shark	---	122.3	124.3	59.7	88	5/25	37	0	9.9
SY Ovation	147.3	119.0	122.8	60.4	95	5/29	37	0	8.0
IDO1708	---	---	122.2	60.1	95	5/25	35	0	7.7
UI Castle CL+	127.6	103.0	121.8	61.7	92	5/31	36	0	8.8
IDN09-15702A	---	---	120.6	61.5	93	5/28	37	0	8.9
XA1801	---	---	120.4	61.3	94	5/26	35	0	8.0
OR2121086	---	112.8	120.0	61.3	94	5/27	37	0	8.5
Norwest Tandem	140.6	85.7	119.3	61.4	96	5/24	33	0	8.7
SY Dayton	---	114.0	119.2	60.6	90	5/29	36	0	7.8
Bobtail	137.0	108.9	118.0	59.2	86	5/30	34	0	8.8
Jasper	156.1	115.1	117.6	60.5	93	5/29	36	0	8.1
WB1604	---	80.0	117.2	61.3	86	5/25	34	0	8.9
Brundage	122.7	105.4	117.1	62.1	97	5/24	37	0	8.7
LCS Artdeco	136.5	117.5	116.2	60.6	95	5/24	32	0	8.5
UI Magic CL+	127.7	86.6	115.5	60.9	95	5/26	34	0	8.6
LWW14-72916	---	---	112.4	60.9	92	5/24	32	0	8.5
OR2121285	---	---	111.7	61.8	85	5/29	33	0	8.4
WB 456	142.2	91.3	108.3	63.2	96	5/25	35	0	8.8
ORI2150031Cl+	---	116.3	106.8	60.8	94	5/28	37	0	8.1
LCS Drive	149.1	91.3	106.7	60.1	94	5/24	29	0	8.9
ORI2150061Cl+	---	---	96.3	62.3	94	5/25	36	0	10.8
WB1376CLP	138.2	86.4	92.4	63.6	94	5/26	37	0	10.1
Average	141.2	108.8	123.9	61.1	93	5/27	35	0	8.6
LSD (α=.05)	23.0	28.0	23.4	0.7	8.8	1.5	2.5	0.0	
CV %	11.6	18.3	13.5	0.8	6.7	0.7	5.0	.	
Pr > F	0.0339	0.0034	0.0003	<.0001	0.4756	<.0001	<.0001	.	

Table 21. Agronomic Data for Winter Wheat at Rupert, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Soft White Winter Wheat									
SY Dayton	---	138.9	164.2	60.3	100	6/2	36	0	8.6
WB1529	104.0	139.2	161.2	62.4	100	5/31	36	0	9.1
LCS Artdeco	101.7	126.8	160.3	59.5	100	5/30	34	0	8.1
IDO1708	---	---	160.1	58.9	100	5/29	38	0	8.6
UIL15-72223	---	---	158.9	60.5	100	6/1	38	0	8.7
SY Ovation	96.2	130.7	158.8	60.5	100	5/31	37	0	9.0
XA1801	---	---	158.0	61.3	100	5/31	36	0	9.0
Bruneau	87.0	151.5	157.1	59.7	100	6/3	39	0	9.0
LWW14-74143	---	---	155.5	57.3	100	5/31	38	0	8.7
LWW14-72916	---	---	155.2	60.8	100	5/30	31	0	9.2
Bobtail	91.8	157.5	153.7	57.9	100	6/2	35	0	9.4
UI Magic CL+	93.3	136.5	152.1	60.7	100	5/29	35	0	9.1
UI Sparrow (QC)	---	118.4	151.9	58.0	100	6/3	40	0	9.5
LCS Hulk	91.8	140.4	151.8	61.5	100	6/2	36	0	8.6
WB1783	94.2	125.7	149.9	60.5	100	6/1	39	0	9.6
Jasper	84.3	118.8	149.4	59.3	100	6/2	38	0	9.6
SY Assure	103.1	133.6	149.2	61.4	100	5/27	34	0	8.9
Stephens	80.3	125.5	148.4	59.2	100	5/31	37	0	9.3
IDN09-15702A	---	---	148.3	61.1	100	6/1	39	0	9.6
UIL14-75044	---	---	147.3	58.9	100	6/2	36	0	9.8
IDO1005	---	---	146.9	60.6	100	6/2	39	0	9.8
WB1376CLP	90.5	138.9	146.7	62.9	100	5/31	38	0	10.2
WA8232	84.4	141.8	146.3	61.0	100	6/3	37	0	8.6
LCS Shark	---	140.5	146.0	58.7	100	5/30	36	0	9.2
UI Sparrow	77.8	121.4	145.7	57.8	100	6/3	42	0	9.5
UI Castle CL+	86.2	146.5	145.5	60.8	100	6/2	39	0	9.4
OR2121086	---	131.8	145.0	59.9	100	6/2	39	0	8.9
LCS Drive	106.4	143.3	144.1	57.7	100	5/29	31	0	8.9
XB1104	---	---	144.0	62.7	100	5/27	31	0	8.4
Brundage	89.2	135.2	143.6	61.5	100	5/30	37	0	8.7
WB1604	---	124.9	143.4	60.7	100	5/30	37	0	9.8
IDN10-08606A	---	---	142.9	59.4	100	6/4	41	0	8.9
Norwest Tandem	91.1	136.5	142.2	59.6	100	5/30	32	0	9.1
IDN07-28017B	85.9	141.1	141.6	60.3	100	5/31	39	0	9.9
OR2121285	---	---	139.6	60.4	100	6/1	34	0	9.5
WB 456	91.4	118.0	135.5	62.7	100	5/29	36	0	9.5
Rosalyn	---	---	134.8	57.9	100	6/2	37	0	9.3
OR2101043	---	137.6	134.6	60.2	100	6/2	37	0	8.9
ORI2150031Cl+	---	117.7	134.3	60.0	100	6/1	38	0	10.3
ORI2150061Cl+	---	---	131.9	61.9	100	5/30	36	0	10.9
Average	90.5	133.7	148.1	60.1	100	5/31	37	0	9.2
LSD (α=.05)	9.2	19.3	15.2	0.9	0.4	1.4	2.3	0.0	
CV %	7.3	10.3	7.3	1.1	0.3	0.6	4.5	.	
Pr > F	<.0001	<.0001	0.0	<.0001	0.5535	<.0001	<.0001	.	

Table 22. Agronomic Data for Winter Wheat at Aberdeen, Irrigated, 2018.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2016**	**2017**	**2018**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**
Soft White Winter Wheat									
UIL15-72223	---	---	199.9	59.7	94	6/1	39	1	9.7
WB1783	184.7	155.2	196.6	62.1	94	5/31	39	0	9.6
LWW14-74143	---	---	196.4	57.0	96	5/28	39	0	9.5
UI Magic CL+	113.8	130.5	187.5	61.2	96	5/30	38	0	9.8
UI Sparrow (QC)	---	151.4	184.8	58.1	95	5/31	44	6	10.8
UI Sparrow	124.8	138.3	184.1	58.4	86	6/2	45	4	10.8
SY Dayton	---	156.0	183.3	59.8	94	6/1	39	0	9.4
SY Ovation	160.0	152.4	181.6	59.7	96	5/31	39	0	8.4
LCS Hulk	160.7	146.5	181.1	60.8	94	6/2	38	0	9.8
OR2101043	---	146.4	180.9	60.1	95	5/31	40	0	10.4
WB1529	134.5	153.1	180.7	61.9	98	5/30	39	0	10.0
IDO1005	---	---	180.0	60.2	95	6/3	41	0	9.4
UIL14-75044	---	---	178.7	58.3	84	6/1	39	3	10.2
LCS Shark	---	124.6	178.4	58.9	91	5/30	38	0	10.3
Jasper	147.3	126.9	177.8	59.9	95	6/2	40	0	10.5
Bruneau	124.6	157.1	177.3	59.7	93	6/1	39	15	9.1
IDN09-15702A	---	---	176.9	58.9	95	6/2	42	0	11.0
Brundage	53.9	126.7	176.9	60.5	98	5/29	41	0	10.6
LCS Artdeco	136.6	144.6	176.1	59.4	95	5/29	35	0	9.1
IDN10-08606A	---	---	176.0	60.0	89	6/2	44	14	10.2
LWW14-72916	---	---	175.6	60.4	93	5/29	34	0	9.4
OR2121086	---	146.3	175.1	58.6	95	6/2	40	0	9.6
IDO1708	---	---	174.3	57.7	98	5/29	38	14	9.0
IDN07-28017B	150.5	131.1	172.6	60.6	95	5/30	40	0	10.2
OR2121285	---	---	170.6	58.5	93	6/1	36	0	10.7
WB1604	---	146.4	169.1	60.8	93	5/29	36	0	10.0
Bobtail	143.0	159.9	169.1	57.8	93	6/1	38	0	10.2
Rosalyn	---	---	167.4	57.9	93	5/31	40	1	9.6
SY Assure	155.2	136.5	167.4	60.6	96	5/29	36	0	9.7
WB 456	134.7	142.5	166.9	62.2	94	5/30	39	0	10.3
XB1104	---	---	163.8	61.2	96	5/27	35	0	10.7
Stephens	111.7	154.9	163.0	57.2	88	6/1	39	0	10.3
WB1376CLP	134.7	138.7	162.7	62.5	95	5/30	41	0	10.4
Norwest Tandem	150.6	148.8	159.5	58.5	90	5/29	33	0	9.9
UI Castle CL+	136.0	153.4	159.4	59.4	90	6/2	42	33	12.9
LCS Drive	173.0	137.8	157.0	56.9	96	5/29	36	6	10.2
WA8271	---	---	156.4	59.9	93	5/30	37	70	12.5
ORI2150031Cl+	---	138.1	150.1	59.7	94	6/1	41	0	9.5
ORI2150061Cl+	---	---	145.7	61.3	80	5/29	38	0	11.1
Average	137.5	144.2	173.4	59.6	93	5/31	39	4	10.1
LSD (α=.05)	18.5	17.1	13.3	1.2	10.9	3.3	2.9	10.6	
CV %	9.6	8.4	5.5	1.4	8.4	1.5	5.3	182.2	
Pr > F	<.0001	<.0001	<.0001	<.0001	0.6230	0.0009	<.0001	<.0001	

Table 23. Agronomic Data for Winter Wheat at Rexburg, Irrigated, 2018.

Variety	Yield (bu/A) 2018	Combine Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Soft White Winter Wheat							
Jasper	146.6	56.8	100	5/22	39	0	8.3
UI Castle CL+	146.4	56.4	100	5/25	38	0	7.7
SY Ovation	141.3	61.2	100	5/22	39	0	7.7
WA8232	138.5	62.2	100	5/26	40	0	7.7
UI Magic CL+	137.8	62.8	100	5/23	37	0	8.3
SY Dayton	135.2	58.2	100	5/21	38	0	8.0
LWW14-74143	133.4	59.1	100	5/20	37	0	7.5
WB1783	132.2	58.7	100	5/23	38	0	8.3
IDO1005	131.7	63.1	100	5/21	38	0	7.6
Rosalyn	129.1	59.3	100	5/21	38	0	8.0
IDN10-08606A	128.8	61.8	100	5/21	36	0	7.7
IDN09-15702A	127.4	62.7	100	5/21	37	0	7.6
IDO1708	126.9	61.7	100	5/21	37	0	7.7
OR2101043	126.6	60.9	100	5/22	39	0	8.4
Bruneau	125.8	57.7	100	5/25	39	0	7.9
UIL15-72223	124.5	59.3	100	5/27	40	0	7.6
UIL14-75044	124.0	58.1	100	5/27	39	0	8.0
LCS Shark	122.8	62.8	100	5/19	36	0	7.8
XA1801	122.2	63.4	100	5/24	37	0	7.9
Brundage	121.4	58.2	100	5/22	39	0	8.5
Norwest Tandem	119.8	60.8	100	5/21	40	0	8.5
OR2121086	115.8	57.5	100	5/22	39	0	8.4
OR2121285	115.3	58.2	100	5/22	39	0	8.4
LCS Hulk	111.5	63.6	100	5/20	38	0	7.6
Bobtail	109.2	57.8	100	5/24	36	0	8.5
UI Sparrow	107.2	60.4	100	5/29	41	0	8.1
WB 456	106.8	64.1	100	5/19	38	0	8.7
IDN07-28017B	105.8	61.9	100	5/21	36	0	7.6
WB1529	105.7	66.4	100	5/24	38	0	8.8
LWW14-72916	105.6	63.0	100	5/19	36	0	7.6
WB1376CLP	105.1	64.1	100	5/22	39	0	9.2
Stephens	104.8	62.0	100	5/22	38	0	8.6
WB1604	102.5	61.3	100	5/24	38	0	8.3
SY Assure	101.8	63.6	100	5/18	38	0	8.5
ORI2150061Cl+	96.1	61.6	100	5/22	39	0	8.4
ORI2150031Cl+	90.9	59.3	100	5/22	39	0	8.4
LCS Drive	90.1	61.8	100	5/17	34	0	8.3
XB1104	88.3	63.6	100	5/24	37	0	7.7
LCS Artdeco	84.2	63.8	100	5/19	37	0	7.6
Average	118.3	60.9	100	5/22	38	0	8.1
LSD (α=.05)	30.2	3.8	0.0	0.0	0.0	0.0	0.1
CV %	18.2	4.3	0.0	0.0	0.0	.	1.0
Pr > F	0.0002	<.0001	.	<.0001	<.0001	.	<.0001

Table 24. Agronomic Data for Winter Wheat at Ririe, Dryland, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Soft White Winter Wheat									
LWW14-72916	---	---	64.8	59.6	88	6/12	23	0	10.5
UI Sparrow	46.1	34.7	64.7	59.6	84	6/16	31	0	10.8
IDN10-08606A	---	---	60.5	60.9	93	6/16	30	0	11.5
Eltan	42.2	35.2	58.8	60.6	88	6/19	31	0	12.0
WA8271	---	---	57.9	62.5	76	6/18	29	0	12.3
WB1783	50.0	35.3	57.4	62.9	73	6/14	29	0	12.2
Otto	50.1	41.2	57.2	60.3	76	6/18	29	0	11.9
Bruneau	40.7	35.6	56.6	61.3	74	6/16	28	0	11.0
LCS Hulk	51.5	33.2	56.2	60.8	88	6/14	26	0	11.2
UIL14-75044	---	---	55.1	58.6	74	6/17	26	0	12.5
Norwest Tandem	44.8	34.0	55.0	60.8	83	6/13	25	0	10.6
XA1801	---	---	52.3	61.9	100	6/13	25	0	11.2
UI Magic CL+	41.5	33.8	52.3	60.8	73	6/14	27	0	12.3
ORI2150031Cl+	---	31.0	52.1	60.3	83	6/15	30	0	12.3
UIL15-72223	---	---	51.9	60.6	72	6/13	27	0	11.0
Jasper	51.5	38.4	51.7	57.7	86	6/16	29	0	13.4
WB1529	---	29.0	51.6	62.8	98	6/12	23	0	10.9
WB1376CLP	42.8	25.9	51.5	62.1	68	6/12	28	0	14.0
IDO1708	---	---	51.3	59.6	91	6/10	26	0	10.1
IDN07-28017B	---	35.0	50.7	62.2	88	6/12	27	0	10.4
Norwest Duet	48.8	40.3	50.5	60.3	74	6/15	32	0	11.0
Brundage	34.3	29.0	50.4	61.1	59	6/11	26	0	10.8
LWW14-73161	---	---	50.2	60.2	83	6/14	29	0	11.2
UI Castle CL+	44.8	32.4	49.6	61.1	98	6/17	29	0	12.7
SY Command	---	36.1	49.0	58.6	86	6/15	27	0	10.6
SY Banks	---	35.4	48.4	58.8	83	6/16	29	0	11.4
Rosalyn	---	---	48.1	57.3	73	6/17	27	0	11.1
WB1604	---	---	47.7	61.0	90	6/11	25	0	11.2
XB1104	---	---	47.4	62.3	93	6/7	22	0	10.9
OR2121285	---	---	47.3	59.1	71	6/16	26	0	13.0
Stephens	44.8	30.5	45.5	59.9	85	6/12	26	0	10.8
OR2121086	---	30.3	43.0	60.7	80	6/14	27	0	12.4
OR2101043	---	35.4	42.7	60.0	88	6/14	27	0	11.3
IDO1005	---	---	41.9	60.6	98	6/16	28	0	11.7
IDN09-15702A	---	---	41.3	60.9	80	6/13	25	0	12.1
ORI2150061Cl+	---	---	39.7	62.4	81	6/11	26	0	12.3
Average	44.4	33.0	51.5	60.6	83	6/14	27	0	11.6
LSD (α=.05)	8.3	5.0	8.4	1.0	31.8	1.8	2.7	0.0	
CV %	13.3	9.2	11.7	1.2	27.5	0.8	7.2	.	
Pr > F	0.0003	<.0001	<.0001	<.0001	0.8969	<.0001	<.0001	.	

Table 25. Agronomic Data for Winter Wheat at Rockland, Dryland, 2018.

Variety	Yield (bu/A) 2017	Yield (bu/A) 2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Soft White Winter Wheat								
WA8271	---	47.9	62.5	92	6/4	24	0	8.8
UI Sparrow	---	44.1	59.5	92	6/3	26	0	8.7
LCS Hulk	---	44.0	61.5	88	6/2	25	0	8.5
Norwest Tandem	---	42.6	60.9	92	6/1	24	0	9.0
Norwest Duet	---	41.2	61.3	90	6/3	29	0	8.6
UI Magic CL+	---	40.8	61.9	92	6/1	25	0	9.6
IDN10-08606A	---	40.2	60.3	91	6/2	26	0	9.2
UI Castle CL+	---	39.9	61.4	92	6/4	26	0	9.9
IDN07-28017B	---	39.8	61.8	92	6/1	27	0	8.9
Jasper	44.1	39.7	59.4	91	6/3	26	0	9.4
UIL15-72223	---	39.0	60.3	92	6/1	27	0	8.8
SY Banks	43.3	38.7	59.1	88	6/3	26	0	8.8
UIL14-75044	---	38.1	59.2	90	6/2	22	0	9.0
IDO1005	---	38.0	61.1	92	6/3	26	0	10.0
LWW14-72916	---	38.0	59.4	91	6/1	23	0	8.3
LWW14-73161	---	36.2	60.4	91	6/2	27	0	9.0
Bobtail	---	35.5	56.7	92	6/3	24	0	8.6
IDO1708	---	34.4	59.4	90	6/1	27	0	8.4
SY Command	34.2	33.7	59.1	91	6/2	24	0	8.2
IDN09-15702A	---	32.9	61.5	92	6/1	25	0	9.8
Average	35.5	39.2	60.3	91	6/2	25	0	9.0
LSD (α=.05)	8.1	7.4	0.6	4.5	0.6	1.4	0.0	
CV %	15.1	13.2	0.7	3.5	0.3	4.0	.	
Pr > F	0.0024	0.0194	<.0001	0.7324	<.0001	<.0001	.	

Table 26. Agronomic Data for Winter Wheat at Soda Springs, Dryland, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Soft White Winter Wheat									
IDN10-08606A	---	---	82.4	55.2	95	6/23	31	0	12.5
SY Banks	---	76.5	82.0	54.9	94	6/23	32	0	11.8
WA8271	---	---	81.7	58.9	94	6/24	30	0	12.5
UI Sparrow	91.5	86.8	80.8	55.8	97	6/23	35	0	11.9
IDN07-28017B	---	94.1	80.4	57.8	98	6/20	30	0	11.7
Bruneau	91.7	68.1	79.9	57.3	98	6/23	30	0	10.7
LWW14-72916	---	---	79.0	54.6	99	6/19	25	0	11.8
OR2121086	---	---	77.9	55.4	92	6/21	31	0	11.4
Eltan	---	86.7	77.4	56.4	99	6/24	34	0	13.4
WB1529	---	79.5	77.0	57.2	97	6/20	28	0	13.4
WB1783	---	96.7	75.8	58.1	100	6/20	29	0	11.6
IDN09-15702A	---	---	75.3	55.7	97	6/20	30	0	12.4
UIL14-75044	---	---	74.3	54.7	92	6/22	28	0	12.3
UIL15-72223	---	---	74.2	53.4	97	6/20	31	0	12.4
LWW14-73161	---	86.1	73.8	55.6	93	6/20	31	0	12.7
LCS Hulk	108.3	73.7	73.2	55.4	95	6/22	30	0	14.2
IDO1005	---	---	73.2	56.7	96	6/22	30	0	13.5
WB1376CLP	89.8	69.1	72.0	58.4	98	6/19	30	0	12.7
XB1104	---	---	71.9	56.6	98	6/18	25	0	12.9
Rosalyn	---	---	71.7	55.4	96	6/21	29	0	11.7
WB1604	---	79.5	71.3	56.8	99	6/18	28	0	12.7
UI Magic CL+	88.4	56.4	70.6	57.1	93	6/18	28	0	12.4
Norwest Tandem	91.2	91.6	70.3	55.3	98	6/19	26	0	10.7
XA1801	---	---	70.2	55.8	97	6/20	28	0	13.2
Norwest Duet	---	---	70.1	53.2	86	6/23	32	0	13.3
IDO1708	---	---	70.0	53.0	93	6/19	32	0	12.9
SY Command	---	68.3	70.0	54.8	86	6/22	28	0	11.4
OR2121285	---	---	69.3	53.9	96	6/22	28	0	13.3
Jasper	99.2	75.1	69.2	52.2	100	6/22	31	0	12.1
Otto	---	87.3	69.1	55.2	88	6/25	31	0	14.0
ORI2150061Cl+	---	---	68.6	58.1	90	6/20	27	0	13.7
OR2101043	---	---	67.2	55.6	86	6/22	28	0	12.1
Stephens	79.4	58.5	66.1	53.4	94	6/21	29	0	13.0
ORI2150031Cl+	---	65.7	64.3	54.8	86	6/22	28	0	13.4
UI Castle CL+	92.4	78.9	60.1	54.3	84	6/23	30	0	13.6
Average	93.4	76.4	73.1	55.6	94	6/21	29	0	12.6
LSD (α=.05)	15.3	21.7	11.6	2.2	8.8	1.8	2.1	0.0	
CV %	9.8	20.2	11.3	2.8	6.7	0.7	5.1	.	
Pr > F	0.0345	0.0074	0.0275	<.0001	0.0036	<.0001	<.0001	.	

Table 27. Soft White Winter Wheat Yield Percentage of Location Averages, 2018.

	(100% =Average)							Variety
Variety	**Kimberly**	**Aberdeen**	**Rupert**	**Rexburg**	**Ririe**	**Rockland**	**Soda Springs**	**Average**
UI Sparrow (QC)	112	107	103	120	---	---	---	110
Eltan	---	---	---	---	114	---	106	110
LWW14-74143	106	113	105	113	---	---	---	109
WA8271	---	90	---	---	113	122	112	109
UI Sparrow	120	106	98	91	126	112	111	109
WB1783	109	113	101	112	111	---	104	108
Bruneau	114	102	106	106	110	---	109	108
SY Ovation	99	105	107	119	---	---	---	108
SY Dayton	96	106	111	114	---	---	---	107
WA8232	104	---	99	117	---	---	---	107
IDN10-08606A	106	101	96	109	118	103	113	106
UIL15-72223	110	115	107	105	101	99	101	106
UIL14-75044	121	103	99	105	107	97	102	105
LCS Hulk	110	104	102	94	109	112	100	105
UI Magic CL+	93	108	103	116	102	104	97	103
WB1529	110	104	109	89	100	---	105	103
Otto	---	---	---	---	111	---	94	103
Jasper	95	103	101	124	100	101	95	103
LWW14-72916	91	101	105	89	126	97	108	102
SY Banks	---	---	---	---	94	99	112	102
LCS Shark	100	103	99	104	---	---	---	101
XA1801	97	---	107	103	102	---	96	101
IDN07-28017B	106	99	96	89	98	101	110	100
Norwest Duet	---	---	---	---	98	105	96	100
IDO1708	99	101	108	107	100	88	96	100
Norwest Tandem	96	92	96	101	107	108	96	100
Rosalyn	109	97	91	109	94	---	98	100
IDO1005	103	104	99	111	81	97	100	99
UI Castle CL+	98	92	98	124	96	102	82	99
Brundage	95	102	97	103	98	---	---	99
OR2101043	111	104	91	107	83	---	92	98
OR2121086	97	101	98	98	84	---	106	97
LWW14-73161	---	---	---	---	98	92	101	97
IDN09-15702A	97	102	100	108	80	84	103	96
SY Assure	101	97	101	86	---	---	---	96
Bobtail	95	97	104	92	---	90	---	96
OR2121285	90	98	94	97	92	---	95	94
Stephens	104	94	100	89	88	---	90	94
WB1604	95	98	97	87	93	---	97	94
LCS Artdeco	94	102	108	71	---	---	---	94
XB1104	102	94	97	75	92	---	98	93
WB1376CLP	75	94	99	89	100	---	98	92
SY Command	---	---	---	---	95	86	96	92
WB 456	87	96	91	90	---	---	---	91
ORI2150031Cl+	86	87	91	77	101	---	88	88
LCS Drive	86	91	97	76	---	---	---	88
ORI2150061Cl+	78	84	89	81	77	---	94	84
Location Average (bu/A)	124	173	148	118	51	39	73	

2018 Soft White Winter Wheat Yield Percentage Across All Locations

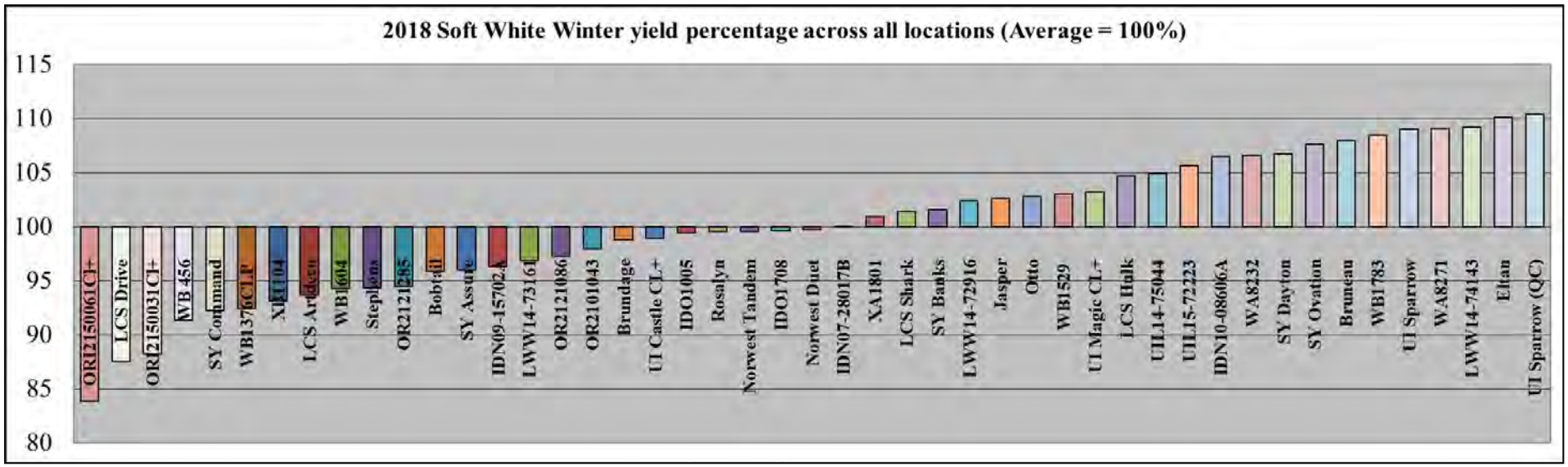


Chart 3. Soft White Winter Wheat Yield Percentage Across All Locations.

Table 28. Winter Barley Irrigated Nurseries, 3-Year Averages (2016-2018; 5 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plumps (>6/64)	Plumps (>5.5/64)	% thin
UT10201	165.4	49.8	87	5/20	36	3	11.2	74.9	16.2	9.1
Thunder	161.2	51.7	90	5/18	33	27	11.3	92.7	4.5	2.9
Sunstar Pride	153.6	48.7	84	5/30	36	19	10.3	42.1	21.4	36.7
02Ab671	143.5	52.4	85	5/23	37	38	11.2	89.9	5.8	4.5
Wintmalt	140.9	51.1	81	5/22	35	30	11.3	90.8	6.0	3.6
Endeavor	139.4	51.9	85	5/21	38	37	11.1	81.1	10.7	8.1
Eight-Twelve	136.6	49.8	81	5/22	38	31	10.7	67.4	19.3	13.6
05ARS561-208	132.2	49.7	83	5/26	34	36	11.0	80.0	11.4	8.6
Charles	131.1	49.8	85	5/19	32	39	11.2	88.3	7.2	4.8
Buck*	119.9	60.3	71	5/22	39	24	13.3	42.7	29.5	28.1
Upspring*	115.4	60.9	63	5/25	38	16	15.2	74.4	16.7	9.0
Average	139.9	52.4	81	5/23	36	27	11.6	74.9	13.5	11.7
LSD (a =.05)	14.1	0.8	7.1	1.0	1.7	11.7	0.7	13.1	6.3	9.6
CV%	16.1	2.4	13.9	1.1	7.4	69.1	4.4	13.7	36.5	64.1
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

* indicates hulless variety

Table 29. Irrigated Winter Barley Data Combined from Rupert and Aberdeen, 2018.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand	Heading Date	Height (in)	Lodging (%)	Protein (%)	Plump (>6/64)	Plump (>5.5/64)	% Thin
UT10201	196.6	51.1	97	5/18	36	0	11.0	84.4	10.3	5.1
Delicatesse	193.4	54.5	97	5/19	38	12	11.1	95.9	2.9	1.4
GW3702	188.5	52.9	98	5/22	38	22	11.0	96.6	2.0	1.2
LCS Calypso	188.2	53.9	98	5/19	41	1	11.4	97.2	1.7	1.0
Sunstar Pride	184.5	51.9	95	5/31	34	24	10.3	61.5	17.3	20.9
Maltesse	183.9	54.7	98	5/20	36	25	10.7	97.0	1.6	0.8
Madness	182.5	54.1	97	5/19	39	1	10.9	96.1	2.2	1.2
2WI15-8688	180.7	53.1	98	5/18	37	20	11.0	88.9	6.3	4.5
Etincel	178.7	52.6	98	5/18	36	9	10.6	95.3	2.8	1.6
KWS Somerset	178.1	52.3	98	5/22	38	16	11.1	95.6	3.0	1.8
Voyel	176.8	53.7	97	5/19	39	0	11.3	96.2	2.2	1.4
KWS Scala	172.8	51.3	97	5/18	36	17	11.3	94.3	2.9	2.4
Thunder	171.2	52.2	95	5/18	33	46	11.3	91.9	4.9	3.0
DH130910	168.1	53.0	98	5/20	40	11	11.2	90.8	4.6	4.0
Wintmalt	167.3	52.1	96	5/22	36	44	10.9	91.8	4.9	3.0
2WI14-7581	161.4	52.6	98	5/18	36	14	11.4	93.5	4.1	2.3
07ARS518-13	161.2	52.6	95	5/21	36	38	11.1	86.7	7.9	5.4
2WI14-7577	160.9	52.1	96	5/20	37	18	11.5	92.3	4.5	2.7
Eight-Twelve	160.2	50.4	97	5/22	38	38	10.6	65.8	17.5	16.6
Rubinesse	157.1	53.1	97	5/25	38	37	11.3	89.8	4.8	5.0
06ARS617-25	156.1	52.1	95	5/20	35	66	11.1	79.6	12.0	8.2
06ARS633-3	149.5	51.0	97	5/22	36	78	10.9	77.1	13.3	9.2
02Ab671	147.3	52.7	95	5/22	39	67	11.3	89.0	6.1	4.6
2WI15-8738	146.7	51.6	95	5/17	35	50	11.5	93.3	3.6	3.0
Endeavor	146.4	52.5	96	5/22	40	62	10.9	80.1	10.3	8.9
Charles	137.9	49.0	95	5/18	32	90	11.3	82.7	9.7	7.2
05ARS561-208	134.5	50.0	94	5/26	35	62	11.1	80.9	11.0	7.8
Buck*	132.1	61.6	83	5/21	39	26	13.2	40.3	29.4	30.3
Upspring*	131.3	62.1	63	5/27	40	14	15.3	80.0	12.5	7.5
Average	166.0	53.0	95	5/21	37	31	11.3	86.6	7.3	5.8
LSD (α = .05)	13.9	0.9	3.1	1.1	2.5	21.0	0.7	8.2	3.9	4.5
CV %	8.5	1.7	3.4	0.8	6.8	69.2	3.1	4.6	26.1	38.0
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

*indicates hulless variety

Table 30. Agronomic Data for Winter Barley at Rupert, Irrigated, 2018.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	2015	2016	2018	(lb/bu)	Stand %	Date	(in)	(%)	(%)	(>6/64)	(>5.5/64)	% Thin
Delicatesse	---	---	180.5	54.0	100	5/21	37	1	11.0	96.1	3.1	1.2
Sunstar Pride	157.5	123.3	165.6	51.8	98	6/1	36	4	10.2	55.4	19.6	24.6
GW3702	---	---	164.6	52.5	100	5/23	38	16	10.9	96.3	2.0	1.4
LCS Calypso	---	---	164.2	53.5	100	5/21	42	0	11.3	97.4	1.7	1.0
Madness	---	---	163.4	53.7	100	5/20	38	1	10.8	97.2	1.8	0.8
UT10201	155.6	142.7	162.8	50.4	100	5/20	35	0	10.8	82.3	11.9	5.6
Maltesse	---	---	162.2	54.5	100	5/21	36	0	10.6	97.0	1.6	0.9
Thunder	---	133.5	160.5	51.5	100	5/20	33	33	11.1	91.9	4.6	3.1
Etincel	---	---	159.5	52.2	100	5/20	35	0	10.6	96.3	2.3	1.1
Voyel	---	---	158.9	53.4	100	5/21	39	0	11.3	96.4	2.2	1.3
2WI15-8688	---	---	154.4	52.8	100	5/21	36	23	10.8	86.3	7.3	5.9
KWS Somerset	---	---	154.3	52.2	100	5/23	40	19	10.6	95.1	3.5	2.0
KWS Scala	---	---	153.6	51.3	100	5/20	37	6	11.2	93.3	3.3	2.9
07ARS518-13	---	---	150.5	51.7	97	5/22	35	8	10.9	89.4	6.2	3.9
2WI14-7581	---	---	150.0	52.2	100	5/20	35	18	11.5	92.5	4.5	2.7
DH130910	---	---	148.2	52.7	100	5/22	39	3	11.1	90.2	4.5	4.5
Wintmalt	---	132.2	147.6	51.8	100	5/23	37	25	10.5	91.2	5.0	3.2
2WI14-7577	---	---	146.7	51.3	99	5/22	36	3	11.5	94.2	3.6	1.5
Rubinesse	---	---	144.1	52.5	100	5/26	37	35	10.9	90.2	4.7	4.6
Eight-Twelve	146.3	145.0	142.8	50.4	100	5/22	38	33	10.5	62.3	18.1	19.0
06ARS633-3	---	---	131.4	50.8	100	5/23	33	64	10.8	75.7	14.2	9.7
06ARS617-25	---	---	131.3	51.9	100	5/22	34	48	10.9	77.8	13.2	8.6
2WI15-8738	---	---	130.0	51.7	99	5/19	34	30	11.3	90.5	4.9	4.2
Endeavor	138.2	136.0	128.1	52.4	100	5/23	36	37	10.8	77.1	11.9	10.0
02Ab671	148.7	145.1	124.1	52.6	100	5/24	39	46	11.2	86.7	7.5	5.9
Buck*	131.0	126.3	122.4	60.9	89	5/21	40	20	12.7	42.3	29.5	28.0
Upspring*	125.5	97.7	115.8	60.8	81	5/26	36	3	14.0	89.2	7.9	2.8
05ARS561-208	150.9	124.3	115.8	49.8	99	5/27	33	51	10.8	79.5	11.9	8.5
Charles	141.6	127.0	112.8	50.5	100	5/20	31	86	11.4	75.8	13.0	10.7
Average	141.8	131.8	146.9	52.7	99	5/22	36	21	11.1	86.0	7.6	6.1
LSD (α=.05)	31.0	12.9	17.2	1.3	4.5	1.4	3.1	31.1				
CV %	15.5	6.9	8.3	1.7	3.3	0.7	6.1	106.3				
Pr > F	0.0069	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001				

*indicates hulless variety

Table 31. Agronomic Data for Winter Barley at Aberdeen, Irrigated, 2018.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	2016	2017	2018	(lb/bu)	Stand %	Date	(in.)	(%)	(%)	(>6/64)	(>5.5/64)	% Thin
UT10201	164.5	126.7	230.4	50.4	94	5/17	38	0	11.2	86.4	8.6	4.6
GW3702	---	---	212.4	52.5	95	5/22	38	27	11.2	96.9	1.9	0.9
LCS Calypso	---	134.7	212.2	53.5	95	5/17	40	1	11.5	96.9	1.6	1.0
2WI15-8688	---	---	207.1	52.8	95	5/15	38	18	11.2	91.4	5.3	3.1
Delicatesse	---	154.4	206.3	54.0	94	5/17	39	23	11.3	95.7	2.6	1.5
Maltesse	---	140.6	205.6	54.5	95	5/19	37	50	10.7	96.9	1.6	0.6
Sunstar Pride	127.6	148.1	203.5	51.8	93	5/30	33	45	10.4	67.6	14.9	17.1
KWS Somerset	---	---	201.9	52.2	95	5/20	37	13	11.6	96.0	2.4	1.6
Madness	---	99.6	201.6	53.7	94	5/17	40	1	11.1	94.9	2.6	1.5
Etincel	---	80.5	197.9	52.2	95	5/17	38	19	10.6	94.2	3.2	2.0
Voyel	---	156.4	194.8	53.4	94	5/18	40	0	11.2	95.9	2.2	1.5
KWS Scala	---	---	192.0	51.3	94	5/17	35	28	11.5	95.3	2.4	1.8
DH130910	---	---	188.0	52.7	95	5/19	40	19	11.3	91.4	4.6	3.5
Wintmalt	140.2	97.8	187.0	51.8	93	5/21	35	64	11.3	92.4	4.8	2.7
Thunder	164.8	165.0	181.9	51.5	90	5/16	33	59	11.4	91.8	5.1	2.8
06ARS617-25	---	157.2	180.9	51.9	90	5/19	36	84	11.2	81.3	10.8	7.8
Eight-Twelve	113.6	104.2	177.7	50.4	94	5/22	38	44	10.7	69.3	16.8	14.2
2WI14-7577	---	---	175.1	51.3	94	5/17	39	34	11.6	90.3	5.4	3.9
2WI14-7581	---	---	172.9	52.2	95	5/16	37	10	11.4	94.4	3.7	1.9
07ARS518-13	---	---	171.9	51.7	94	5/20	37	68	11.4	83.9	9.5	6.8
02Ab671	132.3	145.7	170.5	52.6	90	5/21	39	88	11.3	91.3	4.7	3.3
Rubinesse	---	149.0	170.1	52.5	94	5/24	38	39	11.6	89.4	4.8	5.3
06ARS633-3	---	147.5	167.6	50.8	94	5/21	38	93	11.0	78.5	12.3	8.6
Endeavor	156.0	112.3	164.7	52.4	93	5/21	43	88	11.1	83.0	8.7	7.8
2WI15-8738	---	---	163.4	51.7	90	5/15	37	70	11.6	96.1	2.3	1.7
Charles	151.2	101.5	163.1	50.5	90	5/17	33	93	11.2	89.5	6.4	3.6
05ARS561-208	140.6	127.0	153.2	49.8	89	5/26	37	73	11.4	82.2	10.0	7.1
Upspring*	134.3	82.5	146.7	60.8	45	5/27	44	25	16.6	70.8	17.0	12.1
Buck*	123.6	85.3	141.7	60.9	76	5/21	39	33	13.8	38.2	29.2	32.6
Average	140.3	118.7	185.0	52.7	91	5/20	38	41	11.5	87.2	7.0	5.5
LSD (α=.05)	30.3	53.7	22.1	1.3	4.4	1.7	3.9	28.6				
CV %	15.2	32.2	8.5	1.7	3.5	0.9	7.4	50.1				
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001				

*indicates hulless variety

Table 32. Winter Barley Yield Percentage of Location Averages, 2018.

	(100% =Average)		
Variety	**Rupert**	**Aberdeen**	**Variety Average**
UT10201	125	111	118
Delicatesse	112	123	117
GW3702	115	112	113
LCS Calypso	115	112	113
Sunstar Pride	110	113	111
Maltesse	111	110	111
Madness	109	111	110
2WI15-8688	112	105	108
Etincel	107	109	108
KWS Somerset	109	105	107
Voyel	105	108	107
KWS Scala	104	105	104
Thunder	98	109	104
DH130910	102	101	101
Wintmalt	101	100	101
2WI14-7581	93	102	98
07ARS518-13	93	102	98
2WI14-7577	95	100	97
Eight-Twelve	96	97	97
Rubinesse	92	98	95
06ARS617-25	98	89	94
06ARS633-3	91	89	90
2WI15-8738	88	88	88
02Ab671	92	84	88
Endeavor	89	87	88
Charles	88	77	82
05ARS561-208	83	79	81
Buck*	77	83	80
Upspring*	79	79	79
Location Average (bu/A)	185	147	

* indicates hulless variety

2018 Winter Barley Yield Percentage Across All Locations

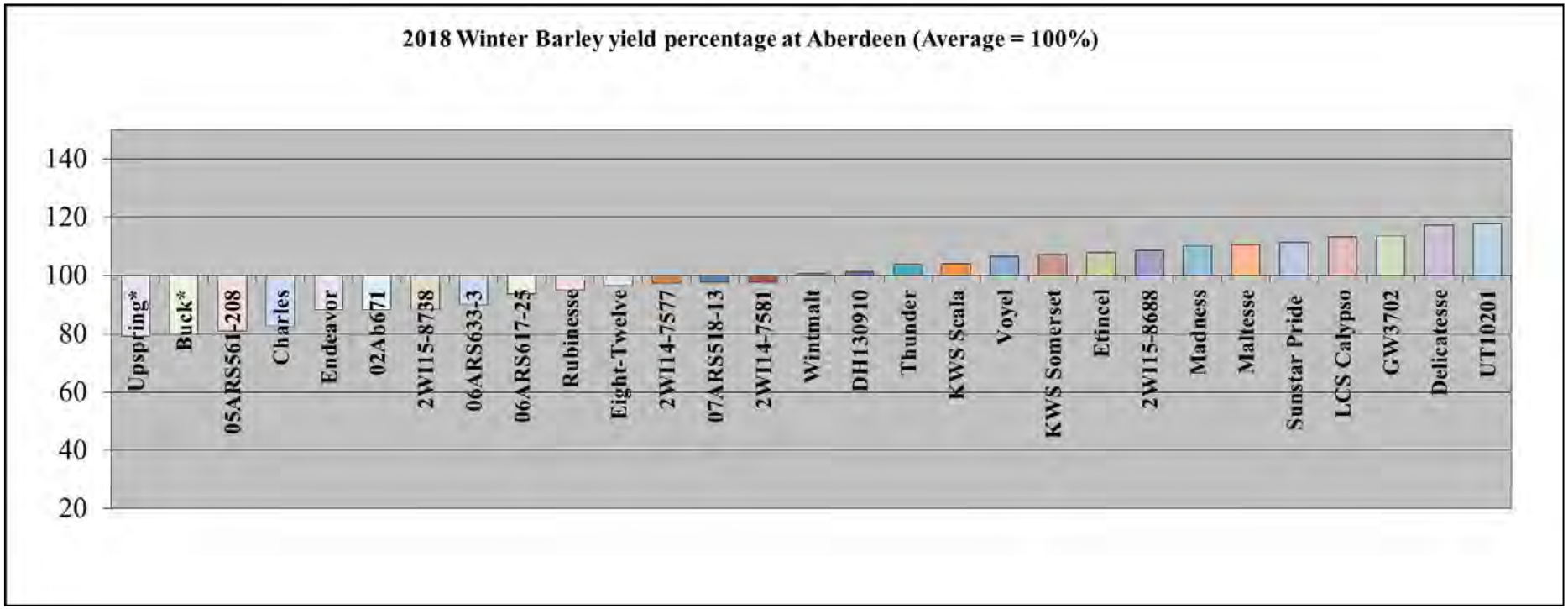


Chart 4. Winter Barley Yield Percentage at Aberdeen

* indicates hulless variety.

Table 33. Hard Spring Wheat Irrigated Nurseries, 3-Year Averages (2016-2018; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Dayn (W)	130.5	62.9	100	6/17	33	0	13.5
SY-Teton	120.6	60.6	100	6/15	30	1	13.3
SY Coho	120.0	60.8	100	6/20	32	3	14.2
LCS Iron	117.3	61.8	99	6/21	32	0	13.3
SY Gunsight	116.0	61.7	100	6/17	31	0	13.9
Alum	115.1	62.7	100	6/20	35	5	14.9
WB9411	114.6	62.4	99	6/16	30	0	14.6
Cabernet	113.9	62.8	100	6/19	28	0	13.9
UI Platinum (W)	112.0	62.9	100	6/15	30	0	13.2
Jefferson	108.9	62.0	100	6/18	33	3	14.0
WB7589 (W)	108.4	62.2	100	6/16	26	0	14.3
IDO1602S	107.2	62.4	100	6/18	33	1	13.6
Alzada (D)	106.4	62.4	99	6/16	31	0	14.3
WB9668	105.6	63.0	100	6/16	28	0	15.9
Klasic (W)	104.7	62.5	100	6/14	25	0	13.5
WB7328 (W)	101.3	62.5	100	6/14	27	0	14.9
Average	112.6	62.2	100	6/17	30	1	14.1
LSD (α =.05)	4.2	0.3	0.5	0.4	0.7	2.0	0.4
CV%	9.2	1.0	1.2	0.6	5.1	603.5	3.8
Pr>F	<.0001	<.0001	0.0779	<.0001	<.0001	<.0001	<.0001

(W) = White

(D) = Durum

Table 34. Hard Spring Wheat Dryland Nurseries, 3-Year Averages (2016-2018; 3 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Dayn (W)	40.8	61.2	93	7/3	25	0	11.2
Alum	37.7	62.2	94	7/5	25	0	12.0
Jefferson	34.3	61.2	95	7/4	25	0	12.2
LCS Iron	34.1	59.4	94	7/6	24	0	11.2
WB9411	33.6	60.6	93	7/2	23	0	11.1
SY Selway	33.0	61.0	95	7/3	25	0	12.1
UI Platinum (W)	32.9	61.2	94	7/1	23	0	10.9
IDO1602S	30.7	61.3	95	7/2	25	0	11.8
WB7589 (W)	30.4	61.3	94	7/2	20	0	11.8
Klasic (W)	28.8	59.9	93	7/1	18	0	11.3
WB9668	28.6	61.3	94	7/2	22	0	13.6
WB7328 (W)	28.2	60.1	95	6/30	21	0	11.9
Average	32.8	60.9	94	7/3	23	0	11.7
LSD (α =.05)	4.1	1.0	2.9	0.5	1.4	0.0	1.0
CV%	15.4	1.9	3.8	0.3	7.7	.	4.9
Pr>F	<.0001	<.0001	0.5342	<.0001	<.0001	.	0.001

(W) = White

Table 35. Irrigated Hard Spring Wheat Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2018.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Dayn (W)	135.9	63.1	100	6/15	34	0	13.1
WA 8285	134.4	63.0	100	6/16	38	0	14.0
12SB0224 (W)	133.9	60.9	100	6/21	33	0	12.1
XB9551	130.9	62.7	100	6/13	34	0	13.6
SY Renegade	126.8	62.3	100	6/22	35	0	13.3
12SB0197	126.8	59.4	100	6/21	33	0	12.1
XB7610	126.3	62.2	100	6/17	34	0	11.2
Klasic (W) Incr seeding rate 1.4	125.8	63.2	100	6/13	27	0	13.5
SY Coho	124.0	60.8	100	6/21	32	0	13.9
XB9610	123.9	62.9	100	6/14	31	0	14.5
LCS Iron	123.6	61.9	100	6/20	34	0	13.0
Alum	122.7	62.8	100	6/19	37	0	14.1
SY-Teton	122.4	61.0	100	6/14	31	0	12.8
Jefferson	121.5	62.3	100	6/16	35	0	13.2
XB9240	120.9	63.0	100	6/13	31	0	14.1
WB9590	119.6	62.4	100	6/15	30	0	14.8
Klasic (W)	119.5	63.1	100	6/13	26	0	13.0
Klasic (W) Incr seeding rate 1.2	119.2	63.3	100	6/13	26	0	13.0
LCS Luna	116.6	61.8	100	6/20	30	0	12.8
SY Gunsight	116.2	61.4	100	6/17	31	0	13.3
UI Platinum (W)	115.5	63.0	100	6/13	31	0	12.7
Glee	114.9	62.6	100	6/14	34	0	13.6
IDO1604S	114.5	62.3	100	6/13	31	0	13.7
WB9578	114.0	62.8	100	6/15	29	0	14.1
WB9411	114.0	62.4	100	6/14	31	0	14.3
Cabernet	113.3	62.9	99	6/18	29	0	13.5
WB7202CLP	112.8	62.4	100	6/13	28	0	12.9
WB7589 (W)	111.9	62.3	100	6/14	26	0	13.9
IDO1602S	111.5	62.3	100	6/15	32	0	13.4
IDO1603S	108.7	62.1	100	6/15	32	0	14.9
WB9668	107.7	63.1	100	6/14	28	0	15.4
WB9433	107.5	60.9	100	6/16	26	0	13.3
IDO1703S	107.3	63.1	100	6/16	33	0	14.7
Alzada (D)	107.2	62.2	98	6/15	32	0	13.6
WB7328 (W)	105.5	62.5	100	6/13	27	0	14.5
IDO1701S	104.7	62.3	100	6/17	30	0	14.5
NS Presser CLP	103.6	60.5	100	7/3	37	0	14.1
Imperial (D)	91.3	59.4	99	6/15	32	0	16.3
Average	115.6	62.0	100	6/16	31	0	13.7
LSD (α = .05)	9.0	0.6	0.5	1.0	1.6	0.0	0.7
CV%	10.5	1.3	0.7	0.8	5.9	.	3.6
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	.	<.0001

(W) = White

(D) = Durum

Table 36. Agronomic Data for Spring Wheat at Rupert, Irrigated, 2018.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2016**	**2017**	**2018**	**(lb/bu)**	**Stand%**	**Date**	**(in)**	**(%)**	**(%)**
Hard Spring Wheat									
Dayn (W)	154.4	126.5	144.0	62.4	100	6/8	32	0	12.5
XB9240	---	---	135.2	63.0	100	6/6	29	0	14.0
XB9551	---	---	134.6	62.1	100	6/6	31	0	13.3
Klasic (W) Incr seeding rate 1.4	---	---	132.3	63.1	100	6/6	24	0	14.3
WA 8285	---	---	130.8	62.3	100	6/10	36	0	13.6
12SB0224 (W)	---	119.9	130.6	60.3	100	6/13	31	0	12.6
SY-Teton	140.4	122.6	130.6	60.6	100	6/7	29	0	12.7
XB9610	---	---	127.5	62.5	100	6/7	29	0	14.8
LCS Iron	129.2	118.5	127.3	60.9	100	6/12	31	0	12.3
SY Coho	138.3	122.0	125.6	59.6	100	6/11	30	0	13.6
Klasic (W) Incr seeding rate 1.2	---	---	125.1	63.3	100	6/6	23	0	13.5
WB9590	---	---	124.8	62.0	100	6/9	29	0	14.6
XB7610	---	---	123.5	61.1	100	6/8	32	0	11.2
UI Platinum (W)	134.7	107.6	123.1	62.6	100	6/7	29	0	12.8
Jefferson	121.9	113.2	122.1	61.5	100	6/9	34	0	12.8
Alum	132.5	115.3	121.9	62.1	100	6/11	34	0	13.8
IDO1603S	---	114.6	120.7	61.7	100	6/9	31	0	14.0
SY Gunsight	116.2	114.9	119.9	61.1	100	6/10	29	0	13.3
LCS Luna	---	---	119.1	61.4	100	6/12	29	0	11.8
IDO1604S	---	---	118.1	62.2	100	6/6	29	0	13.8
WB9433	---	101.4	117.7	61.0	100	6/8	24	0	13.2
Klasic (W)	106.5	107.9	117.7	62.8	100	6/6	23	0	13.5
12SB0197	---	113.4	117.7	58.0	100	6/13	32	0	12.1
WB7202CLP	---	104.1	117.5	62.0	100	6/7	26	0	12.5
Cabernet	130.9	115.0	116.7	62.0	100	6/10	26	0	14.0
WB9578	---	115.4	115.4	62.4	100	6/8	28	0	15.0
Alzada (D)	132.9	109.8	114.9	61.5	100	6/7	28	0	13.8
Glee	---	---	114.7	62.3	100	6/7	31	0	13.3
IDO1703S	---	---	114.2	62.9	100	6/9	31	0	14.7
WB9411	132.3	117.1	114.0	61.6	100	6/7	29	0	14.0
IDO1602S	136.9	108.8	109.9	61.8	100	6/9	30	0	13.0
WB7589 (W)	125.3	103.5	109.7	62.0	100	6/8	24	0	14.3
IDO1701S	---	---	105.6	61.4	100	6/9	29	0	14.3
WB7328 (W)	119.9	106.2	104.8	62.3	100	6/7	25	0	15.1
WB9668	120.1	101.5	103.7	62.0	100	6/8	27	0	16.1
Imperial (D)	---	81.0	99.2	58.1	100	6/9	30	0	16.3
Average	124.9	109.9	120.3	61.7	100	6/8	29	0	13.6
LSD (α=.05)	11.5	12.4	20.2	0.8	0.0	1.2	2.5	0.0	
CV %	6.5	8.0	12.0	0.9	0.0	0.6	6.1	.	
Pr > F	<.0001	<.0001	0.0123	<.0001	.	<.0001	<.0001	.	

All varieties are Hard Red unless annotated.

(W) = Hard White

(D) = Durum

Table 37. Agronomic Data for Spring Wheat at Aberdeen, Irrigated, 2018.

	Yield (bu/A)			Test Wt.	Spring	Heading	Protein
Variety	**2016**	**2017**	**2018**	**(lb/bu)**	**Stand %**	**Date**	**(%)**
Hard Spring Wheat							
WA 8285	---	---	151.8	63.2	100	6/12	14.5
12SB0224 (W)	---	126.3	142.3	60.7	100	6/16	11.5
Dayn (W)	160.2	139.6	141.6	63.2	100	6/12	13.9
SY Renegade	---	---	139.3	62.4	100	6/15	13.0
XB9551	---	---	137.8	62.8	100	6/9	13.1
SY Coho	140.2	119.5	137.5	61.4	100	6/17	14.4
LCS Iron	153.6	118.4	137.2	62.3	100	6/15	13.4
Jefferson	85.8	118.8	135.2	62.2	100	6/13	13.4
12SB0197	---	121.7	134.3	59.4	100	6/17	12.7
XB9610	---	---	133.5	63.0	100	6/11	14.4
UI Platinum (W)	134.2	119.4	133.5	63.4	99	6/10	12.4
IDO1604S	---	---	131.8	62.9	100	6/10	13.7
XB7610	---	---	131.2	61.9	100	6/14	11.1
WB9578	---	106.5	130.8	62.3	100	6/12	13.6
XB9240	---	---	130.0	63.4	100	6/9	14.2
WB9590	---	---	129.0	62.7	100	6/12	15.2
WB7589 (W)	136.4	105.9	129.0	62.4	100	6/11	13.8
Klasic (W) Incr seeding rate 1.4	---	---	128.5	63.1	100	6/9	13.4
SY-Teton	135.2	119.6	126.9	60.9	99	6/11	12.8
Alum	121.6	119.3	126.6	62.4	100	6/15	15.1
Glee	---	---	126.6	62.8	100	6/11	13.7
IDO1602S	132.5	122.9	126.6	62.6	100	6/13	13.5
SY Gunsight	147.4	123.8	126.3	62.0	100	6/13	13.5
WB9668	146.0	104.5	125.0	63.6	100	6/11	15.1
WB9411	140.4	118.1	124.9	63.0	100	6/12	14.5
Klasic (W)	79.6	99.3	124.1	63.0	100	6/10	12.3
IDO1703S	---	---	123.7	63.5	100	6/13	14.8
Cabernet	142.3	114.6	123.3	63.0	97	6/13	13.7
LCS Luna	---	---	122.4	61.3	100	6/15	13.2
IDO1603S	---	106.7	121.8	61.6	99	6/11	15.4
WB7202CLP	---	118.4	121.4	62.8	99	6/10	13.1
Klasic (W) Incr seeding rate 1.2	---	---	120.6	63.0	100	6/9	12.4
WB7328 (W)	117.0	94.8	119.0	62.7	100	6/9	14.4
IDO1701S	---	---	117.8	62.4	100	6/13	14.7
Alzada (D)	136.7	114.2	117.8	62.2	98	6/11	13.4
WB9433	---	110.9	113.3	60.8	100	6/13	13.2
Imperial (D)	---	86.0	106.1	59.4	100	6/11	17.6
Average	120.8	112.0	126.4	62.1	100	6/12	13.7
LSD (α=.05)	8.3	7.9	10.9	1.0	1.3	1.6	
CV %	4.9	5.0	6.2	1.1	0.9	0.7	
Pr > F	<.0001	<.0001	<.0001	<.0001	0.0094	<.0001	

All varieties are Hard Red unless annotated.

(W) = Hard White

(D) = Durum

Table 38. Agronomic Data for Spring Wheat, Idaho Falls, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in)	Lodging (%)	Protein (%)
Hard Spring Wheat									
WA 8285	---	---	141.2	63.7	100	6/16	41	0	14.3
Dayn (W)	94.7	146.8	140.2	63.9	100	6/14	37	0	13.1
12SB0224 (W)	---	144.9	139.1	61.3	100	6/22	35	0	12.5
XB7610	---	---	132.7	63.5	100	6/17	38	0	11.0
Klasic (W)	94.7	128.8	131.9	63.9	100	6/12	30	0	12.9
XB9551	---	---	131.8	63.0	100	6/12	34	0	14.4
Klasic (W) Incr seeding rate 1.2	---	---	131.4	64.2	100	6/11	28	0	13.1
Alum	91.4	109.9	130.0	63.7	100	6/21	40	0	13.7
Klasic (W) Incr seeding rate 1.4	---	---	129.8	63.8	100	6/12	29	0	13.0
Jefferson	93.4	121.6	128.4	63.1	100	6/15	36	0	13.6
12SB0197	---	117.7	127.6	59.8	100	6/21	35	0	12.0
WB7328 (W)	100.7	119.5	126.4	63.3	100	6/12	31	0	14.8
SY Renegade	---	---	125.9	63.3	100	6/21	35	0	14.1
XB9240	---	---	123.6	62.9	100	6/11	33	0	13.7
Glee	---	---	122.8	62.9	100	6/13	37	0	13.8
SY-Teton	89.8	130.2	122.3	60.8	100	6/13	32	0	13.2
XB9610	---	---	121.7	63.4	100	6/15	33	0	14.5
Alzada (D)	85.2	129.1	121.3	62.2	100	6/12	34	0	13.5
LCS Luna	---	---	121.1	62.5	100	6/25	31	0	13.6
LCS Iron	86.8	117.0	120.2	62.2	100	6/22	38	0	13.4
UI Platinum (W)	84.1	117.4	120.1	63.2	100	6/13	33	0	12.7
IDO1603S	---	118.3	119.8	63.0	100	6/13	33	0	14.7
SY Coho	77.9	135.9	118.9	61.3	100	6/25	34	0	14.3
Cabernet	96.0	133.2	118.1	64.2	100	6/22	31	0	13.7
WB7202CLP	---	---	117.7	62.5	100	6/12	31	0	13.2
WB9411	98.0	135.3	117.6	63.4	100	6/13	34	0	14.3
WB9578	---	129.6	117.4	63.5	100	6/16	32	0	14.3
WB7589 (W)	88.1	119.9	115.8	62.3	100	6/14	28	0	13.8
WB9590	---	---	114.0	63.2	100	6/14	32	0	14.9
SY Gunsight	96.5	125.1	113.9	62.2	100	6/17	33	0	13.7
IDO1604S	---	---	111.9	61.6	100	6/13	33	0	13.9
WB9668	84.8	118.6	110.3	63.2	100	6/13	30	0	15.6
IDO1703S	---	---	109.3	63.5	100	6/16	35	0	15.0
IDO1602S	90.8	128.3	108.1	61.7	100	6/14	35	0	13.8
IDO1701S	---	---	107.5	63.1	100	6/17	31	0	14.9
WB9433	---	126.9	107.1	60.6	100	6/16	28	0	13.8
Imperial (D)	---	109.8	84.8	58.4	100	6/14	34	0	16.8
Average	87.7	126.0	119.2	62.4	100	6/15	33	0	14.0
LSD (α=.05)	18.3	15.9	15.3	1.2	0.0	2.9	2.5	0.0	
CV %	14.9	9.0	9.1	1.4	0.0	1.2	5.4	.	
Pr > F	0.1707	<.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 Ashton, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Hard Spring Wheat									
12SB0197	---	101.7	127.5	60.5	100	7/2	32	0	11.7
12SB0224 (W)	---	113.2	123.7	61.4	100	7/4	33	0	11.8
XB9551	---	---	119.5	62.8	100	6/25	36	0	13.7
Dayn (W)	94.5	105.9	117.8	62.8	100	6/25	33	0	12.9
XB7610	---	---	117.8	62.6	100	6/28	33	0	11.4
SY Renegade	---	---	115.1	61.2	100	6/30	34	0	12.8
WA 8285	---	---	113.9	62.9	100	6/26	37	0	13.6
SY Coho	---	90.4	113.9	61.1	100	7/1	32	0	13.3
XB9610	---	---	112.9	62.6	100	6/26	32	0	14.2
Klasic (W) Incr seeding rate 1.4	---	---	112.5	62.9	100	6/25	28	0	13.1
Alum	92.2	107.5	112.3	63.2	100	6/29	36	0	13.9
WB9590	---	---	110.4	61.8	100	6/26	30	0	14.6
SY-Teton	---	99.5	109.7	61.6	100	6/25	31	0	12.4
LCS Iron	97.5	91.8	109.6	62.1	100	7/2	33	0	12.8
SY Gunsight	---	87.4	104.7	60.6	100	6/28	31	0	12.6
Klasic (W)	84.2	77.0	104.3	62.9	100	6/25	26	0	13.3
LCS Luna	---	---	103.7	61.9	100	6/30	31	0	12.5
NS Presser CLP	---	---	103.6	60.5	100	7/3	37	0	14.1
IDO1602S	85.2	76.0	101.5	63.2	100	6/26	31	0	13.1
Jefferson	91.2	75.5	100.2	62.4	100	6/27	35	0	13.1
Klasic (W) Incr seeding rate 1.2	---	---	99.9	62.6	100	6/25	26	0	13.0
WB9411	83.9	94.0	99.5	61.6	100	6/26	29	0	14.5
IDO1604S	---	---	96.0	62.4	100	6/24	31	0	13.6
Glee	---	---	95.3	62.5	100	6/25	34	0	13.6
Cabernet	91.7	90.5	95.0	62.3	100	6/27	29	0	12.8
XB9240	---	---	94.8	62.8	100	6/24	31	0	14.4
WB7202CLP	---	93.4	94.4	62.5	100	6/25	27	0	12.7
WB7589 (W)	91.0	83.2	93.3	62.5	100	6/26	26	0	13.9
WB9578	---	86.5	92.5	62.7	100	6/26	27	0	13.6
WB9433	---	85.7	92.0	61.4	100	6/27	26	0	13.2
WB9668	82.0	78.5	91.7	63.5	100	6/26	29	0	15.0
IDO1701S	---	---	87.7	62.5	100	6/28	29	0	14.2
UI Platinum (W)	92.7	92.0	85.3	62.7	100	6/25	31	0	12.8
IDO1703S	---	---	82.1	62.5	100	6/27	33	0	14.3
Imperial (D)	---	53.0	75.1	61.6	97	6/28	33	0	14.7
Alzada (D)	81.1	58.8	74.6	62.8	93	6/28	33	0	13.6
IDO1603S	---	70.9	72.4	62.2	100	6/26	31	0	15.6
WB7328 (W)	78.6	56.7	71.9	61.9	100	6/25	27	0	13.9
Average	88.0	83.3	100.0	62.2	100	6/27	31	0	13.4
LSD (α=.05)	10.6	10.5	20.6	1.3	1.3	1.2	2.7	0	
CV %	8.6	9.0	14.7	1.5	0.9	0.5	6.2	.	
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	.	

All varieties are Hard Red unless annotated.

(W) = Hard White

(D) = Durum

Table 40. Agronomic Data for Spring Wheat at Soda Springs, Dryland, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Hard Spring Wheat									
Dayn (W)	29.1	33.1	60.3	58.7	90	7/2	29	0	12.5
Duclair	---	---	56.2	58.2	89	7/2	27	0	13.2
LCS Iron	19.5	26.8	55.8	56.3	89	7/6	27	0	12.6
NS Presser CLP	---	---	54.9	58.0	91	7/6	29	0	13.1
SY-Teton	---	---	52.4	56.4	90	7/2	27	0	13.6
12SB0224 (W)	---	27.2	52.4	56.6	89	7/6	27	0	13.3
WB9411	17.5	31.4	52.0	59.4	90	7/1	26	0	13.8
Glee	---	---	51.8	59.0	95	7/2	29	0	14.1
Alum	31.6	32.1	49.3	58.7	88	7/5	29	0	14.7
WB7202CLP	---	28.9	48.9	59.7	88	7/2	23	0	12.1
12SB0197	---	28.0	48.4	57.0	91	7/6	23	0	12.3
Jefferson	26.4	28.3	48.1	59.0	91	7/3	28	0	15.2
WB7589 (W)	19.1	24.3	47.8	58.8	88	7/2	23	0	14.5
PSP2 ENT 1	---	---	47.5	57.8	88	7/2	26	0	14.4
LCS Luna	---	---	47.2	57.7	93	7/6	25	0	13.6
MT1673	---	---	46.9	56.1	86	7/2	27	0	15.0
WA 8285	---	---	46.6	58.2	95	7/2	27	0	13.3
WB9433	---	---	45.8	57.9	90	7/3	22	0	13.9
UI Platinum (W)	24.8	28.3	45.7	59.0	90	7/2	27	0	13.7
Klasic (W) Incr seeding rate 1.2	---	---	44.5	58.3	91	7/1	20	0	13.6
SY Selway	23.3	31.4	44.2	58.1	91	7/3	26	0	14.4
IDO1602S	21.3	26.7	44.1	58.4	91	7/2	26	0	14.0
XB9240	---	---	44.0	57.0	91	7/1	27	0	14.3
XB9551	---	---	44.0	58.4	91	6/30	28	0	14.1
WB9590	---	---	43.0	58.0	89	7/2	23	0	14.5
WB9668	16.7	26.3	42.9	59.0	89	7/3	24	0	15.8
XB9610	---	---	42.6	59.5	90	7/2	27	0	13.4
Klasic (W) Incr seeding rate 1.4	---	---	42.2	57.8	96	6/30	21	0	13.8
XB7610	---	---	41.8	58.0	94	7/3	26	0	13.0
IDO1603S	---	24.3	41.6	58.0	93	7/1	24	0	14.7
Choteau	---	---	41.4	58.8	90	7/2	28	0	15.1
IDO1701S	---	---	41.3	58.7	88	7/2	26	0	15.2
WB7328 (W)	21.0	22.9	40.6	57.4	93	7/1	24	0	14.0
Klasic (W)	22.1	24.2	40.3	57.3	88	7/1	22	0	13.8
IDO1703S	---	---	40.1	58.7	91	7/2	26	0	15.5
IDO1604S	---	---	39.4	57.0	90	7/1	26	0	13.5
PSP2 ENT 3	---	---	38.0	56.8	88	7/3	27	0	14.8
WB9578	---	23.3	37.8	58.6	83	7/2	27	0	14.7
Average	22.3	27.8	46.1	58.0	90	7/2	26	0	14.0
LSD (α=.05)	5.6	6.3	8.2	1.2	6.4	0.8	2.1	0	
CV %	17.7	16.0	12.4	1.5	5.0	0.3	5.8	.	
Pr > F	<.0001	0.0027	<.0001	<.0001	0.1165	<.0001	<.0001	.	

All varieties are Hard Red unless annotated.

(W) = Hard White

(D) = Durum

Table 41. Hard Spring Wheat Yield Percentage of Location Averages, 2018.

Variety	(100% =Average) Aberdeen	Rupert	Idaho Falls	Ashton	Soda Springs	Variety Average
Duclair	---	---	---	---	122	122
Dayn (W)	112	120	118	118	131	120
12SB0224 (W)	113	109	117	124	114	115
WA 8285	120	109	118	114	101	112
NS Presser CLP	---	---	---	104	119	111
SY Renegade	110	---	106	115	---	110
XB9551	109	112	111	120	95	109
LCS Iron	109	106	101	110	121	109
12SB0197	106	98	107	128	105	109
SY-Teton	100	109	103	110	114	107
SY Coho	109	104	100	114	---	107
Alum	100	101	109	112	107	106
XB7610	104	103	111	118	91	105
Klasic (W) Incr seeding rate 1.4	102	110	109	113	91	105
Jefferson	107	102	108	100	104	104
XB9610	106	106	102	113	92	104
PSP2 ENT 1	---	---	---	---	103	103
XB9240	103	112	104	95	96	102
MT1673	---	---	---	---	102	102
Glee	100	95	103	95	112	101
Klasic (W) Incr seeding rate 1.2	95	104	110	100	97	101
WB9590	102	104	96	110	93	101
WB9411	99	95	99	100	113	101
LCS Luna	97	99	102	104	102	101
SY Gunsight	100	100	96	105	---	100
Klasic (W)	98	98	111	104	87	100
UI Platinum (W)	106	102	101	85	99	99
WB7202CLP	96	98	99	94	106	99
WB7589 (W)	102	91	97	93	104	97
Cabernet	97	97	99	95	---	97
IDO1602S	100	91	91	102	96	96
SY Selway	---	---	---	---	96	96
IDO1604S	104	98	94	96	86	96
WB9578	103	96	99	92	82	95
WB9433	90	98	90	92	99	94
WB9668	99	86	93	92	93	92
IDO1603S	96	100	100	72	90	92
Alzada (D)	93	96	102	75	---	91
IDO1703S	98	95	92	82	87	91
Choteau	---	---	---	---	90	90
IDO1701S	93	88	90	88	90	90
WB7328 (W)	94	87	106	72	88	89
PSP2 ENT 3	---	---	---	---	82	82
Imperial (D)	84	82	71	75	---	78
Location Average (bu/A)	126	120	119	100	46	

All varieties are Hard Red Spring unless annotated.
(W) = Hard White
(D) = Durum

2018 Hard Spring Wheat Yield Percentages Across All Locations

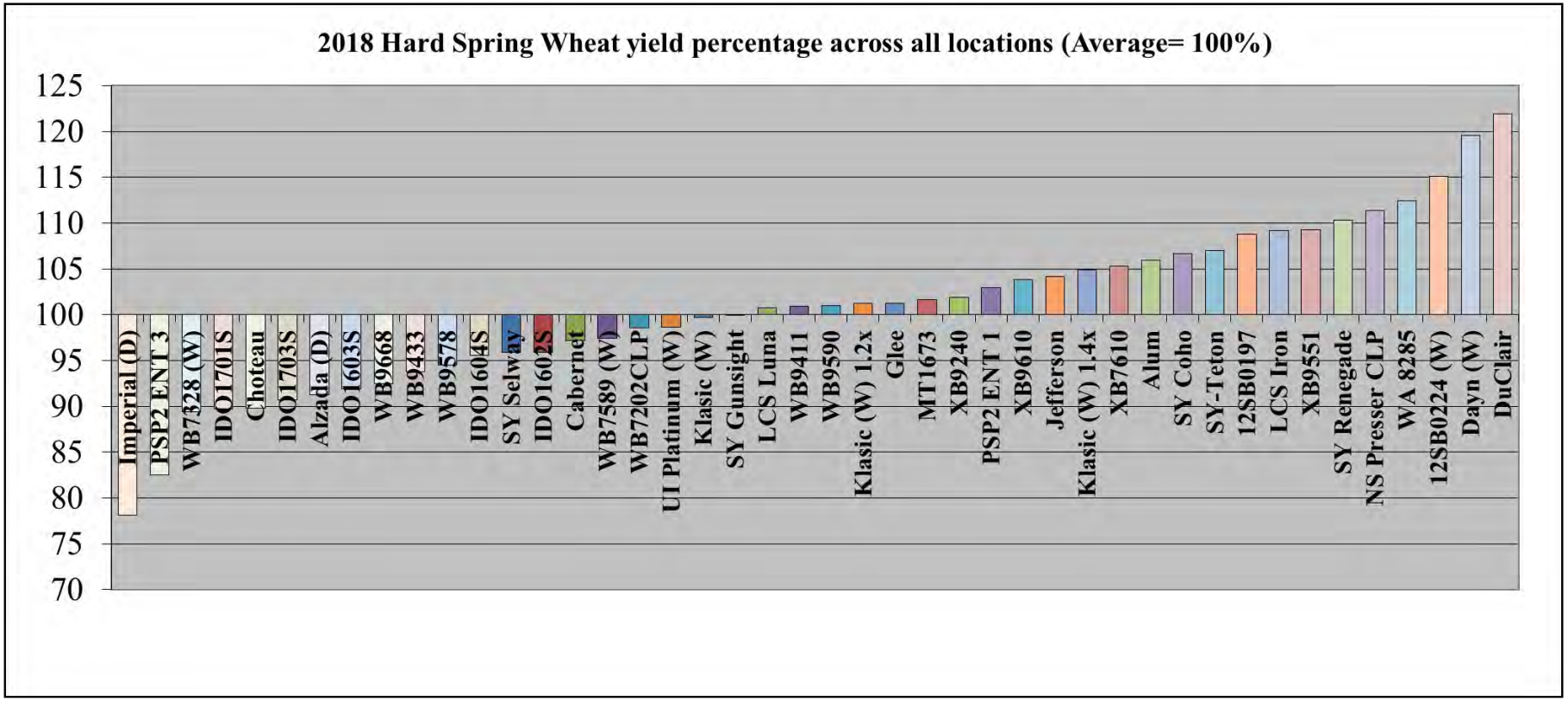


Chart 5. Hard Spring Wheat Yield Percentage Across All Locations.

Table 42. Soft White Spring Wheat Irrigated Nurseries, 3-Year Averages (2016-2018; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
WB6430	123.4	61.8	99	6/17	31	0	10.2
SY Saltese	123.2	62.2	100	6/15	35	6	10.9
Seahawk	122.9	62.3	100	6/22	35	5	10.8
UI Stone	121.5	61.5	100	6/17	34	1	10.3
Alturas	120.2	61.6	100	6/20	34	0	10.3
Melba*	119.5	61.7	100	6/23	34	6	10.2
Tekoa	119.2	62.3	100	6/21	35	2	10.4
IDO1405S	118.8	61.0	99	6/17	34	0	11.0
IDO1403S	115.6	61.9	100	6/20	33	3	11.3
WB6121	111.8	62.5	99	6/17	31	0	11.4
Louise	111.4	61.2	100	6/21	37	15	11.0
UI Pettit	107.4	61.0	100	6/15	32	0	10.3
Average	117.9	61.7	100	6/19	34	3	10.7
LSD (α =.05)	3.9	0.3	0.7	0.5	0.7	3.4	0.5
CV %	8.1	1.2	1.6	0.7	4.7	252.8	6.0
Pr > F	<.0001	<.0001	0.1576	<.0001	<.0001	<.0001	<.0001

*=indicates club wheat

Table 43. Soft White Spring Wheat Dryland Nurseries, 3-Year Averages (2016-2018; 3 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Alturas	45.8	59.8	94	7/5	23	0	10.1
UI Stone	45.2	59.8	95	7/3	25	0	10.4
WB6430	43.8	60.3	93	7/3	22	0	10.7
Louise	43.7	59.5	94	7/5	28	0	10.9
UI Pettit	42.2	56.2	93	7/1	22	0	10.9
WB6121	40.8	60.4	95	7/3	23	0	11.0
IDO1405S	39.0	59.6	94	7/2	25	0	11.3
IDO1403S	38.3	59.9	93	7/5	23	0	11.4
Average	42.3	59.4	94	7/3	24	0	10.8
LSD (α =.05)	4.3	4.8	3.6	0.6	1.5	0.0	0.6
CV%	12.3	9.8	4.6	0.4	7.8	.	3.4
Pr > F	0.0010	0.706	0.9634	<.0001	<.0001	.	0.0139

Table 44. Irrigated Soft White Spring Wheat Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2018.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Ryan	132.1	61.2	100	6/14	35	0	11.0
IDO1401S	130.4	61.6	100	6/14	35	0	10.4
14-FAC-2043	129.9	58.9	100	6/22	36	8	11.0
WB6430	129.1	61.5	100	6/15	32	0	10.6
WA 8303 CL+	128.8	62.1	100	6/13	32	0	10.6
Seahawk	128.0	61.7	100	6/23	37	0	11.1
Alturas	126.4	61.2	100	6/20	35	0	10.4
WA 8297 CL+	125.6	60.8	100	6/19	32	0	11.0
SY Saltese	125.6	62.2	100	6/14	36	0	10.9
UI Stone	125.5	61.1	100	6/16	36	0	10.7
WB6341	123.1	61.6	100	6/16	34	0	9.8
Melba*	122.3	61.3	100	6/22	35	0	10.6
Tekoa	122.2	61.1	100	6/21	36	0	10.3
IDO1405S	122.1	60.4	100	6/16	36	0	10.8
IDO1702S	121.0	62.5	100	6/14	33	0	10.6
IDO1403S	118.1	61.1	100	6/20	36	0	11.0
14-SSW-1059	117.9	58.5	99	6/25	36	0	10.9
Louise	117.1	60.7	100	6/21	39	10	11.2
UI Pettit	115.7	61.0	100	6/13	34	0	10.6
WB6121	114.0	62.2	100	6/15	32	0	11.5
WB-1035CL+	107.8	61.7	100	6/16	33	0	12.0
Average	123.0	61.2	100	6/18	35	1	10.8
LSD (α = .05)	8.6	0.7	0.3	1.2	1.5	4.8	0.7
CV%	10.0	1.6	0.4	1.0	5.5	697.3	4.7
Pr > F	<.0001	<.0001	0.0009	<.0001	<.0001	0.0006	0.0003

* Indicates club variety

Table 45. Agronomic Data for Spring Wheat at Rupert, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in)	Lodging (%)	Protein (%)
Soft White Spring Wheat									
IDO1401S	---	---	137.0	61.9	100	6/7	36	0	10.9
Seahawk	131.6	117.9	137.0	62.1	100	6/13	37	0	11.2
Ryan	---	---	132.7	60.2	100	6/7	34	0	10.9
WA 8303 CL+	---	---	130.6	61.7	100	6/6	32	0	11.0
WA 8297 CL+	---	---	129.9	60.3	100	6/12	31	0	11.4
WB6430	133.3	114.3	126.1	61.7	100	6/8	31	0	10.7
UI Stone	133.3	127.7	125.2	61.1	100	6/9	37	0	11.1
14-SSW-1059	---	119.4	124.6	58.9	100	6/16	36	0	10.9
Tekoa	122.2	130.0	124.5	59.9	100	6/13	35	0	11.5
IDO1405S	131.9	122.6	124.3	60.8	100	6/9	36	0	11.3
Louise	127.7	109.3	123.9	60.2	100	6/12	39	0	10.7
SY Saltese	127.0	117.3	121.7	61.8	100	6/9	36	0	11.0
IDO1702S	---	---	120.3	62.3	100	6/7	31	0	10.8
IDO1403S	126.8	122.5	119.4	61.6	100	6/12	34	0	11.4
14-FAC-2043	---	---	118.8	57.8	100	6/15	35	0	12.0
WB6341	---	116.7	118.4	61.3	100	6/10	32	0	10.2
UI Pettit	110.4	119.3	117.9	61.8	100	6/6	34	0	11.4
WB6121	119.2	107.7	116.9	62.0	100	6/8	32	0	11.8
Alturas	125.0	124.5	114.7	60.9	100	6/12	34	0	10.8
Melba*	128.2	117.5	108.3	60.7	100	6/16	35	0	11.6
WB-1035CL+	---	---	101.1	60.7	100	6/10	32	0	13.3
Average	123.5	119.3	122.5	60.9	100	6/10	34	0	11.2
LSD (α=.05)	12.8	18.1	21.4	1.1	0.0	1.8	3.2	0.0	
CV %	7.3	10.7	12.3	1.3	0.0	0.8	6.5	.	
Pr > F	0.0002	0.5068	0.2083	<.0001	.	<.0001	<.0001	.	

*= indicates club wheat

Table 46. Agronomic Data for Spring Wheat at Aberdeen, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Protein (%)
Soft White Spring Wheat							
WB6430	137.4	120.6	154.2	61.9	100	6/13	10.6
UI Stone	116.8	128.9	152.8	61.5	100	6/13	10.9
14-FAC-2043	---	---	152.3	58.9	100	6/16	11.0
Seahawk	145.1	133.9	145.3	61.5	100	6/18	11.7
Ryan	---	---	145.3	61.7	100	6/10	11.3
WA 8303 CL+	---	---	143.9	63.0	100	6/9	10.8
Melba*	144.0	133.5	143.3	61.7	100	6/17	10.4
SY Saltese	131.8	127.7	141.0	62.8	100	6/12	11.0
IDO1401S	---	---	138.6	61.5	100	6/11	10.5
IDO1405S	139.5	126.6	138.6	60.2	99	6/12	11.6
WB6341	---	121.3	137.7	62.3	100	6/14	9.6
Tekoa	133.8	133.3	137.4	60.6	100	6/16	10.4
WA 8297 CL+	---	---	137.0	60.8	100	6/15	11.2
IDO1702S	---	---	135.2	63.0	100	6/11	10.8
Louise	107.9	123.4	132.6	60.4	100	6/16	11.8
Alturas	102.8	126.2	132.2	60.8	100	6/15	10.4
WB6121	150.9	103.7	131.5	62.9	100	6/12	11.5
UI Pettit	69.0	110.1	126.4	60.6	100	6/10	10.5
IDO1403S	143.6	118.0	126.1	61.1	100	6/14	11.5
14-SSW-1059	---	129.8	125.7	57.4	97	6/21	12.0
WB-1035CL+	---	---	122.0	61.8	100	6/12	11.2
Average	116.9	124.0	138.1	61.2	100	6/14	11.0
LSD (α=.05)	10.6	7.8	14.9	1.9	1.3	2.9	
CV %	6.4	4.5	7.6	2.2	0.9	1.2	
Pr > F	<.0001	<.0001	0.0005	<.0001	0.0046	<.0001	

*= indicates club wheat

Table 47. Agronomic Data for Spring Wheat, Idaho Falls, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Soft White Spring Wheat									
Ryan	---	---	147.6	62.5	100	6/14	37	0	10.3
Alturas	98.3	148.1	144.0	62.8	100	6/22	38	0	10.2
14-FAC-2043	---	---	141.8	61.3	100	6/25	38	23	9.6
IDO1401S	---	---	141.1	62.3	100	6/14	35	0	10.0
SY Saltese	100.5	140.1	140.7	63.0	100	6/14	38	0	10.4
UI Stone	106.2	139.9	137.4	62.3	100	6/14	37	0	10.0
WA 8297 CL+	---	---	137.1	63.0	100	6/22	33	0	9.0
WB6430	105.3	148.3	136.4	61.5	100	6/14	34	0	10.2
Melba*	73.6	133.7	136.1	61.5	100	6/25	38	0	10.2
WB6341	---	146.2	136.0	62.9	100	6/16	36	0	9.3
WA 8303 CL+	---	---	133.1	62.0	100	6/11	33	0	10.0
IDO1702S	---	---	132.7	63.3	100	6/13	35	0	10.4
UI Pettit	90.5	139.0	130.7	61.0	100	6/13	35	0	9.4
Tekoa	77.4	139.1	129.1	63.5	100	6/25	37	0	8.5
IDO1403S	84.3	139.6	128.4	61.5	100	6/24	38	0	10.5
IDO1405S	90.9	140.7	128.2	61.3	100	6/14	37	0	9.8
Seahawk	85.9	138.6	127.4	62.0	100	6/27	38	0	10.5
14-SSW-1059	---	142.0	120.2	58.5	100	6/27	39	0	10.0
Louise	88.6	120.6	119.1	62.3	100	6/25	40	31	10.8
WB6121	84.4	135.4	117.3	62.5	100	6/14	33	0	11.4
WB-1035CL+	---	---	114.7	62.5	100	6/17	35	0	11.5
Average	91.5	138.1	132.3	62.1	100	6/18	36	3	10.1
LSD (α=.05)	13.1	10.7	11.6	0.9	0.0	3.3	2.4	14.6	
CV %	10.1	5.5	6.1	1.0	0.0	1.4	4.7	402.6	
Pr > F	0.0002	0.0008	<.0001	<.0001	.	<.0001	<.0001	0.0029	

*= indicates club wheat

Table 48. Agronomic Data for Spring Wheat at Ashton, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Soft White Spring Wheat									
Alturas	99.1	113.1	114.6	60.3	100	7/1	35	0	10.1
WA 8303 CL+	---	---	107.7	61.9	100	6/25	30	0	10.6
14-FAC-2043	---	---	106.8	57.8	100	7/3	35	0	11.3
IDO1401S	---	---	105.0	60.7	100	6/25	35	0	10.3
Ryan	---	---	103.0	60.6	100	6/25	33	0	11.6
Seahawk	99.5	109.7	102.5	61.3	100	7/3	37	0	10.9
WB6430	101.7	104.9	101.7	60.7	100	6/27	31	0	10.7
Melba*	104.1	110.5	101.5	61.2	100	7/1	33	0	10.1
14-SSW-1059	---	111.3	101.1	59.4	100	7/7	34	0	10.7
WB6341	---	108.3	100.5	60.1	100	6/26	33	0	10.2
SY Saltese	---	108.1	98.9	61.2	100	6/23	36	0	11.2
WA 8297 CL+	---	---	98.4	59.4	100	6/28	33	0	12.5
IDO1403S	93.2	86.9	98.4	60.1	100	6/29	35	0	10.8
Tekoa	87.4	118.2	97.6	60.3	100	7/1	36	0	10.7
IDO1405S	88.9	95.8	97.4	59.5	100	6/28	36	0	10.6
IDO1702S	---	---	95.9	61.5	100	6/26	32	0	10.7
WB-1035CL+	---	---	93.4	61.8	100	6/26	32	0	11.9
Louise	93.9	97.6	92.7	59.9	100	7/1	39	0	11.6
WB6121	84.0	99.7	90.4	61.4	100	6/25	30	0	11.3
UI Stone	107.0	97.5	89.6	59.7	100	6/26	33	0	10.9
UI Pettit	96.2	91.9	87.9	60.5	100	6/25	34	0	11.2
Average	95.7	102.8	99.3	60.4	100	6/28	34	0	10.9
LSD (α=.05)	10.3	7.4	19.7	1.6	0.0	1.5	2.4	0.0	
CV %	7.5	5.1	14.0	1.8	0.0	0.6	5.1	.	
Pr > F	<.0001	0.0001	0.6321	0.0002	.	<.0001	<.0001	.	

*= indicates club wheat

Table 49. Agronomic Data for Spring Wheat at Soda Springs, Dryland, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Soft White Spring Wheat									
Tekoa	---	---	73.8	61.0	91	7/6	30.3	0.0	10.5
Melba*	---	---	65.7	59.5	91	7/7	27.5	0.0	10.5
14-FAC-2043	---	---	65.1	57.1	90	7/6	29.8	0.0	11.5
SY Saltese	---	36.6	61.8	58.9	84	7/3	32.5	0.0	10.5
Alturas	41.8	34.5	61.3	58.9	88	7/5	27.3	0.0	10.3
UI Stone	43.3	33.2	60.2	58.2	91	7/3	28.3	0.0	10.8
WB6341	---	---	59.6	58.0	93	7/3	26.3	0.0	10.4
Louise	34.6	38.0	58.4	58.0	90	7/6	32.0	0.0	11.2
WB6430	38.2	35.4	57.7	59.5	88	7/2	24.0	0.0	11.2
WA 8297 CL+	---	---	57.4	59.2	90	7/3	26.3	0.0	10.7
Seahawk	---	---	56.0	59.0	90	7/6	28.3	0.0	11.2
WA 8303 CL+	---	---	55.9	58.7	86	7/1	25.5	0.0	10.5
UI Pettit	33.1	32.8	55.3	58.9	91	6/30	27.0	0.0	11.0
WB6121	33.6	34.4	54.4	59.2	91	7/3	26.0	0.0	11.0
IDO1401S	---	---	53.4	58.8	93	7/2	25.0	0.0	12.5
IDO1405S	28.8	34.7	53.3	57.5	89	7/1	28.5	0.0	11.8
IDO1403S	32.5	29.6	52.9	58.5	86	7/5	26.5	0.0	11.6
WB-1035CL+	---	---	50.9	58.2	91	7/2	26.3	0.0	12.4
Ryan	---	---	50.1	56.9	96	7/2	27.8	0.0	11.0
IDO1702S	---	---	48.7	59.9	90	7/2	27.5	0.0	10.9
Average	34.6	33.9	57.6	58.7	90	7/3	27.6	0.0	11.1
LSD (α=.05)	7.5	4.1	10.2	1.0	7.6	0.9	2.3	0.0	
CV %	15.1	8.4	12.5	1.2	5.9	0.3	5.8	.	
Pr > F	0.0251	0.0040	0.0015	<.0001	0.4261	<.0001	<.0001	.	

*= Club Wheat

Table 50. Soft White Spring Wheat Yield Percentage of Location Averages, 2018.

Variety	(100% =Average) Aberdeen	Rupert	Idaho Falls	Ashton	Soda Springs	Variety Average
Ryan	105	108	112	104	114	109
14-FAC-2043	110	97	107	108	106	106
Alturas	96	94	109	115	114	106
IDO1401S	100	112	107	106	98	105
Seahawk	105	112	96	103	105	104
WA 8303 CL+	104	107	101	108	101	104
WB6430	112	103	103	102	92	102
IDO1405S	100	101	97	98	113	102
UI Stone	111	102	104	90	100	101
SY Saltese	102	99	106	100	95	101
Tekoa	100	102	98	98	104	100
IDO1702S	98	98	100	97	107	100
WA 8297 CL+	99	106	104	99	88	99
Melba*	104	88	103	102	98	99
WB6341	100	97	103	101	94	99
14-SSW-1059	91	102	91	102	---	96
WB6121	95	95	89	91	105	95
Louise	96	101	90	93	94	95
IDO1403S	91	97	97	99	84	94
UI Pettit	92	96	99	88	85	92
WB-1035CL+	88	83	87	94	102	91
Location Average (bu/A)	138	123	132	99	58	

* indicates club wheat

2018 Soft White Spring Wheat Yield Percentages Across All Locations

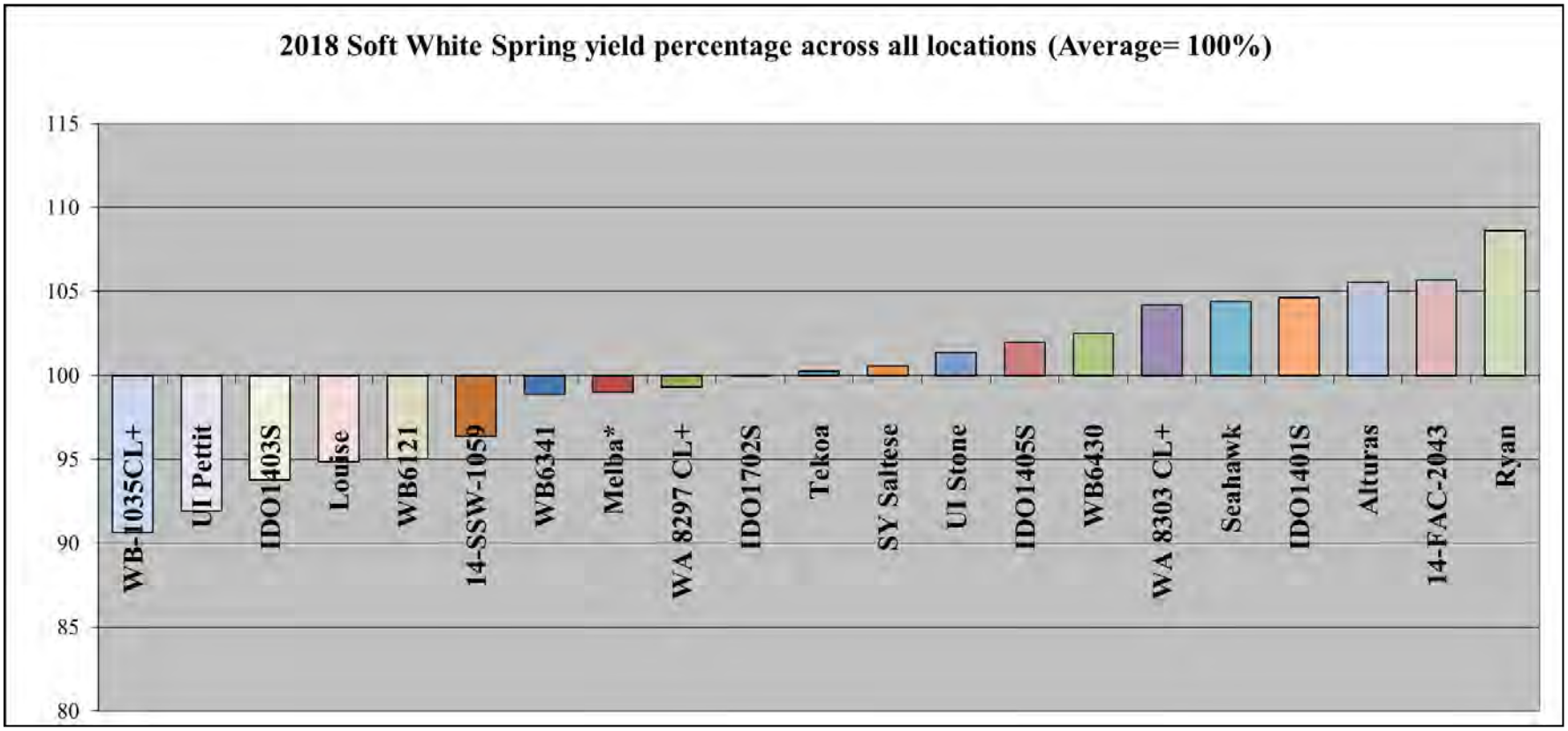


Chart 6. Soft White Spring Yield Percentage Across All Locations.

Table 51. 2-Row Spring Malt Barley Irrigated Nurseries, 3-Year Averages (2016-2018; 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
LCS Odyssey	142.2	50.9	100	6/24	28	17	11.3	91.5	5.5	3.4
LCS Genie	138.2	52.5	99	6/24	28	12	11.2	90.8	6.1	3.4
ABI Voyager	136.9	52.6	100	6/21	34	18	11.0	95.7	2.9	2.2
Moravian 69	133.8	51.0	99	6/23	27	17	11.0	83.5	10.1	6.9
2Ab08-X05M010-82	131.0	52.2	98	6/24	32	21	11.0	88.5	7.1	5.1
CDC Copeland	128.1	52.3	100	6/23	36	24	11.2	92.2	5.3	3.3
ACC Synergy	128.1	52.4	100	6/21	33	26	11.2	93.6	4.2	3.1
Conrad	127.0	52.8	99	6/22	31	21	11.1	93.7	4.3	2.6
ABI Growler	125.6	51.9	100	6/22	31	12	11.1	90.6	5.5	4.7
AC Metcalfe	121.1	52.7	100	6/20	33	22	11.2	91.5	4.9	4.2
Average	131.2	52.1	99	6/23	31	19	11.1	91.1	5.6	3.9
LSD (α =.05)	5.3	0.5	0.7	0.5	0.8	7.2	0.2	4.2	2.2	2.1
CV%	9.9	2.1	1.8	0.7	6.1	89.2	2.2	5.5	47.5	65.8
Pr > F	<.0001	<.0001	0.0065	<.0001	<.0001	0.0001	0.0014	<.0001	<.0001	<.0001

Table 52. Irrigated 2-Row Spring Malt Barley Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2018.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)	Plumps (>6/64)	Plumps (>5.5/64)	% Thin
Esma	170.1	52.7	100	6/18	32	21	11.0	95.0	3.6	1.7
Sangria	159.0	52.3	100	6/19	34	5	11.0	94.0	4.7	2.0
Manta	154.4	52.6	100	6/21	31	35	11.0	83.4	11.0	3.8
SY Sirish	149.9	52.5	100	6/22	31	1	11.3	93.5	4.3	2.8
Moravian 179	149.9	53.5	100	6/21	29	9	11.2	98.1	1.5	0.9
Full Pint	146.1	53.2	100	6/14	24	20	11.0	92.2	5.3	3.3
LCS Sienna	142.8	52.0	100	6/24	32	32	11.1	87.2	7.6	4.6
LCS Genie	141.2	52.5	100	6/24	30	8	11.3	89.8	7.5	3.4
Moravian 69	140.1	50.9	100	6/21	29	37	11.2	77.1	14.4	8.8
LCS Odyssey	139.7	50.3	100	6/23	30	15	11.5	88.3	6.6	4.4
DH120058	139.4	51.6	100	6/17	28	16	10.8	87.8	8.8	4.1
AD120341	139.4	52.3	100	6/16	23	19	11.1	77.9	13.3	9.8
DH120285	137.0	51.8	100	6/18	25	7	10.9	92.5	5.3	2.9
Explorer	135.6	51.9	100	6/22	29	14	11.3	90.2	6.3	4.1
ABI Voyager	134.7	53.2	99	6/20	38	5	11.0	96.6	2.5	1.7
CDC Fraser	132.1	52.1	100	6/21	36	27	11.4	93.9	3.8	2.9
LCS Opera	129.9	48.7	99	6/24	30	11	11.2	78.3	10.6	10.3
ABI Growler	129.6	51.7	100	6/21	36	9	11.3	92.2	4.7	3.7
AAC Connect	129.0	53.3	100	6/21	37	2	11.7	92.8	4.6	3.0
ABI Eagle	128.2	52.5	100	6/21	34	8	11.6	90.6	6.0	4.1
2Ab08-X05M010-82	128.0	52.3	100	6/23	35	21	11.2	87.4	7.8	5.4
08ARS116-91	126.4	52.9	100	6/16	35	16	11.1	89.9	6.4	3.9
GemCraft	126.4	51.4	100	6/20	36	28	11.0	87.3	7.8	5.3
2B13-6991	124.2	52.9	97	6/19	35	10	11.3	94.9	3.9	2.0
AAC Synergy	123.8	52.3	100	6/20	37	27	11.3	90.5	5.7	4.6
Conrad	121.9	52.8	100	6/21	35	24	11.4	92.7	5.0	2.6
CDC Copeland	120.6	52.5	100	6/22	40	22	11.4	90.7	6.3	3.5
CDC Bow	119.7	53.7	97	6/24	39	1	11.5	96.4	2.4	1.8
Merit 57	113.0	50.2	99	6/22	37	22	11.8	79.5	11.4	9.4
AC Metcalfe	112.3	52.9	100	6/21	38	11	11.5	92.1	4.9	3.4
Average	134.6	52.2	100	6/20	33	16	11.2	89.8	6.4	4.1
LSD (α = .05)	11.0	1.0	1.1	1.4	2.3	19.9	0.3	9.9	4.8	5.4
CV%	10.1	2.4	1.4	1.0	6.9	125.6	1.7	6.6	45.5	78.1
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	0.0006	<.0001	0.0003	<.0001	<.0001

Table 53. Agronomic Data for Spring Malt Barley at Rupert, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (>6/64)	(>5.5/64)	% Thin
2-Row Spring Malt Barley												
SY Sirish	---	143.1	166.8	53.9	100	6/16	28	3	11.3	97.3	1.4	1.6
LCS Sienna	---	136.4	166.1	53.9	100	6/17	31	8	10.7	95.7	2.5	2.0
LCS Genie	152.5	148.4	161.3	53.8	100	6/15	28	12	11.1	96.4	3.0	1.3
LCS Opera	---	142.5	160.8	51.8	100	6/14	27	11	10.9	95.7	3.3	1.4
AAC Connect	---	---	160.2	54.6	100	6/14	37	4	11.6	98.8	1.2	0.6
Moravian 69	151.1	145.5	158.6	53.0	100	6/17	28	7	11.0	95.3	3.4	1.7
CDC Fraser	---	---	156.5	52.3	100	6/15	32	43	11.0	96.3	2.4	1.7
LCS Odyssey	179.0	158.6	156.5	52.1	100	6/16	28	19	11.4	94.9	3.4	2.0
Explorer	---	130.2	153.3	53.2	100	6/16	25	11	11.1	95.9	2.3	2.4
ABI Voyager	157.1	140.2	150.8	53.4	100	6/14	37	9	10.8	99.1	1.1	0.8
ABI Growler	150.4	133.4	150.8	52.7	100	6/16	32	4	11.1	96.8	2.4	1.6
GemCraft	---	143.6	148.9	52.1	100	6/15	35	55	11.0	94.6	3.8	2.3
Moravian 179	---	---	147.1	53.6	100	6/17	28	19	11.1	99.1	0.7	0.7
2Ab08-X05M010-82	154.1	140.8	147.1	53.0	100	6/16	34	40	10.8	93.2	4.4	2.6
Conrad	140.6	138.3	147.1	53.5	100	6/15	33	34	11.2	96.9	2.5	1.2
ABI Eagle	---	143.8	146.8	53.3	100	6/14	31	19	11.4	95.0	4.1	1.5
08ARS116-91	---	---	146.1	53.4	100	6/9	35	3	10.6	93.3	3.5	2.3
AD120341	---	---	146.1	53.2	100	6/15	23	19	10.5	92.9	5.3	2.9
AAC Synergy	147.1	155.7	144.4	53.6	100	6/15	36	45	11.2	97.5	2.1	1.3
Full Pint	---	---	142.8	53.2	100	6/12	24	20	10.8	94.2	3.6	2.7
DH120058	---	---	141.2	52.0	100	6/17	28	16	10.7	93.5	5.3	1.7
CDC Copeland	153.2	139.2	137.9	53.4	100	6/15	37	19	11.3	96.8	2.0	1.5
2B13-6991	---	---	137.4	53.0	100	6/13	33	11	11.2	96.0	2.6	1.9
CDC Bow	---	---	136.8	53.6	100	6/16	37	3	11.1	97.2	1.7	1.4
DH120285	---	---	134.3	51.6	100	6/17	25	7	10.7	93.2	5.0	2.3
Merit 57	---	---	130.3	51.8	100	6/16	33	8	11.5	91.5	5.6	3.5
AC Metcalfe	135.1	133.7	129.3	53.8	100	6/13	37	23	11.0	97.9	1.7	1.0
Average	150.2	138.2	148.3	53.1	100	6/15	31	17	11.0	95.7	3.0	1.8
LSD (α=.05)	18.0	21.4	17.7	1.4	0.0	1.9	3.4	28.7				
CV %	8.5	11.0	8.4	1.8	0.0	0.8	7.8	118.0				
Pr > F	<.0001	0.0390	0.0004	0.0010	.	<.0001	<.0001	0.0126				

Table 54. Agronomic Data for Spring Malt Barley, Aberdeen, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Protein (%)	Plump (>6/64)	(>5.5/64)	% Thin
2-Row Spring Malt Barley										
Esma	---	---	173.7	52.9	100	6/15	11.1	96.6	2.7	1.1
Sangria	---	---	169.7	52.8	100	6/17	11.3	94.4	4.2	2.0
Manta	---	---	167.6	54.5	100	6/17	11.3	89.2	4.8	1.8
SY Sirish	---	150.0	162.0	52.5	100	6/18	11.6	91.0	5.6	4.0
LCS Sienna	---	156.6	156.1	52.5	100	6/19	11.4	81.3	9.4	5.4
LCS Genie	159.6	148.0	155.0	51.9	100	6/18	11.7	83.6	12.4	5.1
Explorer	---	146.2	153.8	51.8	100	6/16	11.9	85.2	9.1	6.0
Full Pint	---	---	149.5	53.2	100	6/17	11.2	90.1	7.0	3.8
DH120285	---	---	139.7	52.0	100	6/19	11.1	91.7	5.5	3.4
CDC Fraser	---	---	138.7	52.7	100	6/15	11.7	91.2	4.4	4.8
Moravian 69	163.3	118.6	138.6	50.3	100	6/19	11.5	66.3	20.7	12.9
DH120058	---	---	137.5	51.3	100	6/18	11.0	82.1	12.2	6.4
AAC Connect	---	---	136.0	53.0	100	6/15	11.8	92.7	4.4	3.4
LCS Odyssey	164.8	157.4	136.0	48.9	100	6/18	12.0	78.1	9.6	8.2
ABI Voyager	143.4	129.0	134.1	53.1	98	6/16	11.3	94.5	4.0	2.2
2B13-6991	---	---	134.0	53.3	90	6/16	11.4	96.3	3.1	1.3
ABI Growler	127.5	135.9	133.3	50.4	100	6/17	11.4	82.0	10.0	8.8
08ARS116-91	---	---	133.3	52.7	100	6/11	11.7	85.3	8.9	5.5
AD120341	---	---	132.6	51.3	100	6/17	11.6	62.9	21.3	16.7
AAC Synergy	135.1	128.9	131.3	52.3	100	6/15	11.3	90.0	6.6	4.3
GemCraft	---	136.3	128.8	52.8	100	6/15	11.3	93.5	4.8	2.2
2Ab08-X05M010-82	155.0	129.0	127.0	52.3	99	6/17	11.8	85.9	8.3	5.8
CDC Copeland	143.6	122.9	125.6	52.2	100	6/18	11.6	87.3	9.2	4.6
CDC Bow	---	---	125.4	53.9	96	6/17	11.7	95.5	3.6	2.2
AC Metcalfe	137.0	104.1	122.0	52.1	100	6/16	11.8	87.9	7.4	5.1
ABI Eagle	---	131.4	118.3	50.7	100	6/17	11.8	83.4	8.5	8.4
LCS Opera	---	153.7	117.8	45.9	99	6/20	11.9	51.4	17.6	27.0
Conrad	138.1	150.2	117.7	52.7	98	6/16	12.0	92.8	5.1	2.0
Merit 57	---	---	117.0	50.6	96	6/18	11.9	78.9	14.3	6.7
Average	144.1	132.1	138.1	52.0	99	6/17	11.5	85.8	8.3	5.8
LSD (α=.05)	21.7	17.4	22.2	2.3	3.2	2.1				
CV %	10.7	9.3	11.4	3.1	2.3	0.9				
Pr > F	0.0001	<.0001	<.0001	<.0001	<.0001	<.0001				

Table 55. Agronomic Data for Spring Malt Barley at Idaho Falls, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (>6/64)	(>5.5/64)	% Thin
2-Row Spring Malt Barley												
Esma	---	---	166.4	52.5	100	6/22	32	21	10.9	93.3	4.4	2.3
Moravian 179	---	---	152.6	53.5	100	6/25	31	0	11.3	97.1	2.2	1.1
ABI Voyager	134.2	159.0	152.5	54.4	100	6/16	40	8	10.5	98.8	1.2	0.8
LCS Odyssey	138.6	118.0	148.4	50.4	100	6/23	30	28	11.1	90.8	6.8	2.9
Sangria	---	---	148.3	51.8	100	6/22	34	5	10.7	93.5	5.1	2.0
ABI Eagle	---	148.8	146.0	53.4	100	6/17	37	5	11.4	94.4	3.7	2.2
SY Sirish	---	129.6	144.0	51.2	100	6/25	31	0	11.1	91.0	6.8	2.7
CDC Bow	---	---	141.3	54.2	99	6/24	41	0	11.5	96.9	2.1	1.5
Manta	---	---	141.1	50.8	100	6/24	31	35	10.7	77.6	17.2	5.8
LCS Sienna	---	115.9	139.0	50.4	100	6/26	33	82	10.8	83.3	11.8	5.6
CDC Fraser	---	---	138.5	53.1	100	6/18	38	38	11.2	96.6	3.0	1.2
Explorer	---	130.3	137.5	51.9	100	6/24	31	30	10.8	92.0	5.8	2.6
2Ab08-X05M010-82	124.5	133.1	135.2	52.7	100	6/24	35	23	10.9	86.7	7.9	6.1
LCS Genie	116.8	128.5	135.1	52.4	100	6/26	31	13	11.1	90.5	7.2	2.8
2B13-6991	---	---	131.9	53.2	100	6/16	35	20	11.0	94.4	4.2	1.8
AAC Synergy	118.0	140.5	130.2	51.2	100	6/17	38	35	11.1	86.1	7.5	7.2
LCS Opera	---	111.6	130.1	47.2	100	6/27	31	23	10.8	75.9	15.4	9.1
ABI Growler	114.5	118.9	126.9	52.1	100	6/18	37	23	11.1	96.3	3.0	1.3
08ARS116-91	---	---	125.3	53.4	100	6/16	36	45	10.9	94.6	4.5	1.7
GemCraft	---	112.8	124.9	51.3	100	6/20	37	30	10.5	81.3	10.8	8.0
Moravian 69	114.2	126.5	123.0	49.5	100	6/26	29	67	11.0	69.7	19.1	11.7
CDC Copeland	109.3	147.4	119.5	53.0	100	6/17	41	48	11.4	92.4	5.1	3.4
Conrad	121.7	134.1	119.4	53.1	100	6/21	37	38	11.0	90.1	6.5	3.4
Merit 57	---	---	117.2	47.5	100	6/19	40	59	11.7	64.7	15.2	20.2
Average	115.9	133.6	136.4	51.8	100	6/21	35	28	11.0	88.7	7.4	4.5
LSD (α=.05)	14.5	19.6	18.3	1.9	0.4	3.5	3.5	37.9				
CV %	8.8	10.4	9.5	2.6	0.3	1.4	7.2	95.9				
Pr > F	<.0001	<.0001	<.0001	<.0001	0.4773	<.0001	<.0001	0.0014				

Table 56. Agronomic Data for Spring Malt Barley at Ashton, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (>6/64)	(>5.5/64)	% Thin
2-Row Spring Malt Barley												
SY Sirish	---	108.2	127.1	52.4	100	7/2	33	0	11.3	94.5	3.2	2.7
LCS Odyssey	124.5	106.3	117.9	49.9	100	7/5	32	0	11.4	89.2	6.6	4.3
LCS Sienna	---	120.8	116.0	51.5	100	7/4	33	6	11.5	88.6	6.5	5.2
LCS Genie	132.0	107.3	113.4	51.8	100	7/5	33	0	11.4	88.7	7.4	4.4
ABI Growler	107.4	101.4	112.8	51.8	99	7/4	38	0	11.5	93.8	3.4	3.1
LCS Opera	---	110.5	111.0	50.1	99	7/7	31	0	11.3	90.3	6.0	3.8
Conrad	108.5	105.6	103.3	51.8	100	7/4	35	0	11.4	91.1	5.7	3.9
GemCraft	---	114.0	102.9	49.4	100	7/2	37	0	11.3	79.7	11.9	8.8
2Ab08-X05M010-82	121.0	102.2	102.6	51.3	99	7/6	37	0	11.1	83.9	10.5	7.2
ABI Eagle	---	101.2	101.7	52.5	100	7/5	34	0	11.9	89.4	7.5	4.4
ABI Voyager	120.5	120.5	101.2	51.8	100	7/3	37	0	11.5	94.1	3.5	3.0
08ARS116-91	---	---	101.0	52.0	99	6/29	35	0	11.3	86.5	8.7	6.1
CDC Copeland	115.2	124.6	99.4	51.5	100	7/8	42	0	11.4	86.3	8.9	4.4
Explorer	---	103.1	97.9	50.8	100	7/2	31	0	11.4	87.6	7.9	5.3
CDC Fraser	---	---	94.6	50.6	100	7/5	37	1	11.6	91.4	5.3	3.8
2B13-6991	---	---	93.4	52.2	100	7/2	38	0	11.7	92.7	5.7	3.1
AAC Connect	---	---	90.7	52.4	100	7/4	36	0	11.8	87.0	8.3	5.0
AAC Synergy	108.1	108.3	89.1	51.9	100	7/3	39	0	11.4	88.4	6.6	5.5
Merit 57	---	---	87.6	50.8	100	7/7	37	0	12.0	82.8	10.3	7.3
AC Metcalfe	112.3	101.6	85.8	52.7	100	7/5	40	0	11.8	90.4	5.6	4.2
CDC Bow	---	---	75.3	53.2	93	7/7	40	0	11.6	96.1	2.3	2.2
Average	116.1	107.1	101.2	51.5	99	7/4	36	0	11.5	89.2	6.8	4.7
LSD (α=.05)	11.8	21.7	15.4	1.2	2.0	1.9	2.9	3.9				
CV %	7.2	14.4	10.8	1.6	1.4	0.7	5.7	852.5				
Pr > F	0.0041	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.4871				

Table 57. Agronomic Data for Spring Malt Barley at Soda Springs, Dryland, 2018.

Variety	Yield (bu/A) 2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (>6/64)	Plump (>5.5/64)	% Thin
2-Row Spring Malt Barley										
2B13-6991	74.6	46.4	89	7/3	32	1/0	11.8	76.8	14.8	8.5
ABI Voyager	73.1	47.2	94	7/4	31	1/0	11.1	90.1	7.0	2.7
ABI Eagle	68.4	45.8	93	7/5	30	1/0	12.0	69.0	18.9	11.6
Moravian 165	64.9	48.9	94	7/4	34	1/0	11.6	76.5	16.2	7.3
GemCraft	63.1	45.5	90	7/5	29	1/0	11.2	66.1	19.6	14.3
AAC Connect	60.6	47.4	94	7/4	30	1/0	11.9	67.2	23.7	9.3
Merit 57	59.4	45.3	94	7/6	31	1/0	12.1	72.0	15.6	13.1
ABI Growler	54.7	44.6	93	7/5	29	1/0	12.1	78.9	13.1	8.5
Average	64.9	46.4	92	7/4	31	0	11.7	74.6	16.1	9.4
LSD (α=.05)	10.3	1.5	3.9	0.8	2.4	0.0				
CV %	10.8	2.3	2.9	0.3	5.4	.				
Pr > F	0.0074	0.0002	0.0835	<.0001	0.0071	.				
1-rep demonstration plots										
Esma	79.2	49.3	95	7/4	32	0	11.2	74.6	19.7	6.1
CDC Fraser	73.7	47.1	95	7/6	31	0	11.6	84.1	10.3	4.9
08ARS116-91	73.5	46.2	95	7/3	30	0	11.5	80.6	13.0	6.9
LCS Sienna	72.9	46.8	95	7/8	32	0	11.6	84.3	11.3	4.0
AAC Synergy	72.6	46.8	95	7/5	35	0	11.3	77.8	15.2	7.5
2Ab08-X05M010-82	71.5	47.6	95	7/6	29	0	11.0	62.7	20.0	16.9
Manta	71.1	48.8	95	7/5	31	0	11.3	66.3	23.7	10.3
Conrad	70.7	48.8	90	7/6	25	0	11.2	81.1	12.6	6.2
SY Sirish	69.5	48.5	95	7/4	29	0	11.6	78.1	14.9	7.7
LCS Odyssey	66.4	45.7	90	7/7	31	0	11.9	76.4	15.6	7.8
AD120341	66.2	49.1	90	7/6	30	0	11.2	67.3	23.6	8.9
Explorer	65.5	49.3	95	7/5	27	0	11.1	79.6	16.1	4.7
LCS Genie	65.0	49.1	90	7/7	30	0	11.7	89.5	6.9	2.4
CDC Copeland	62.5	47.6	90	7/7	33	0	11.1	85.0	10.6	4.9
LCS Opera	60.7	42.9	90	7/8	26	0	11.5	62.8	23.9	13.5
CDC Bow	59.4	48.8	90	7/6	34	0	11.3	83.5	13.1	4.0
Full Pint	57.1	49.1	90	7/5	25	0	11.3	59.5	29.0	11.5
Sangria	53.8	49.6	90	7/4	27	0	11.5	80.1	15.6	4.2
Moravian 69	51.8	47.6	90	7/7	24	0	11.4	70.9	19.7	9.5
Moravian 179	45.9	47.1	90	7/6	24	0	11.8	74.8	17.1	7.7
Average	65.5	47.8	92	7/5	29	0	11.4	76.0	16.6	7.5

Table 58. 2-Row Spring Malt Barley Yield Percentage of Location Averages, 2018.

	(100% =Average)					
Variety	**Aberdeen**	**Rupert**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Variety Average**
Esma	126	---	122	---	---	124
Sangria	123	---	109	---	---	116
SY Sirish	117	112	106	126	---	115
Manta	121	---	103	---	---	112
LCS Sienna	113	112	102	115	---	110
LCS Genie	112	109	99	112	---	108
LCS Odyssey	99	105	109	116	---	107
Moravian 179	---	99	112	---	---	106
ABI Voyager	97	102	112	100	113	105
Explorer	111	103	101	97	---	103
Full Pint	108	96	---	---	---	102
CDC Fraser	100	106	101	94	---	100
Moravian 165	---	---	---	---	100	100
LCS Opera	85	108	95	110	---	100
ABI Eagle	86	99	107	101	105	100
Moravian 69	100	107	90	---	---	99
2B13-6991	97	93	97	92	115	99
2Ab08-X05M010-82	92	99	99	101	---	98
DH120058	100	95	---	---	---	97
ABI Growler	97	102	93	111	84	97
AAC Connect	99	108	---	90	93	97
AD120341	96	99	---	---	---	97
GemCraft	93	100	92	102	97	97
08ARS116-91	97	99	92	100	---	97
DH120285	101	91	---	---	---	96
AAC Synergy	95	97	95	88	---	94
Conrad	85	99	88	102	---	93
CDC Copeland	91	93	88	98	---	92
CDC Bow	91	92	104	74	---	90
Merit 57	85	88	86	87	92	87
AC Metcalfe	88	87	---	85	---	87
Location Average (bu/A)	138	148	136	101	65	

2018 Spring Malt Barley Yield Percentage Across All Locations

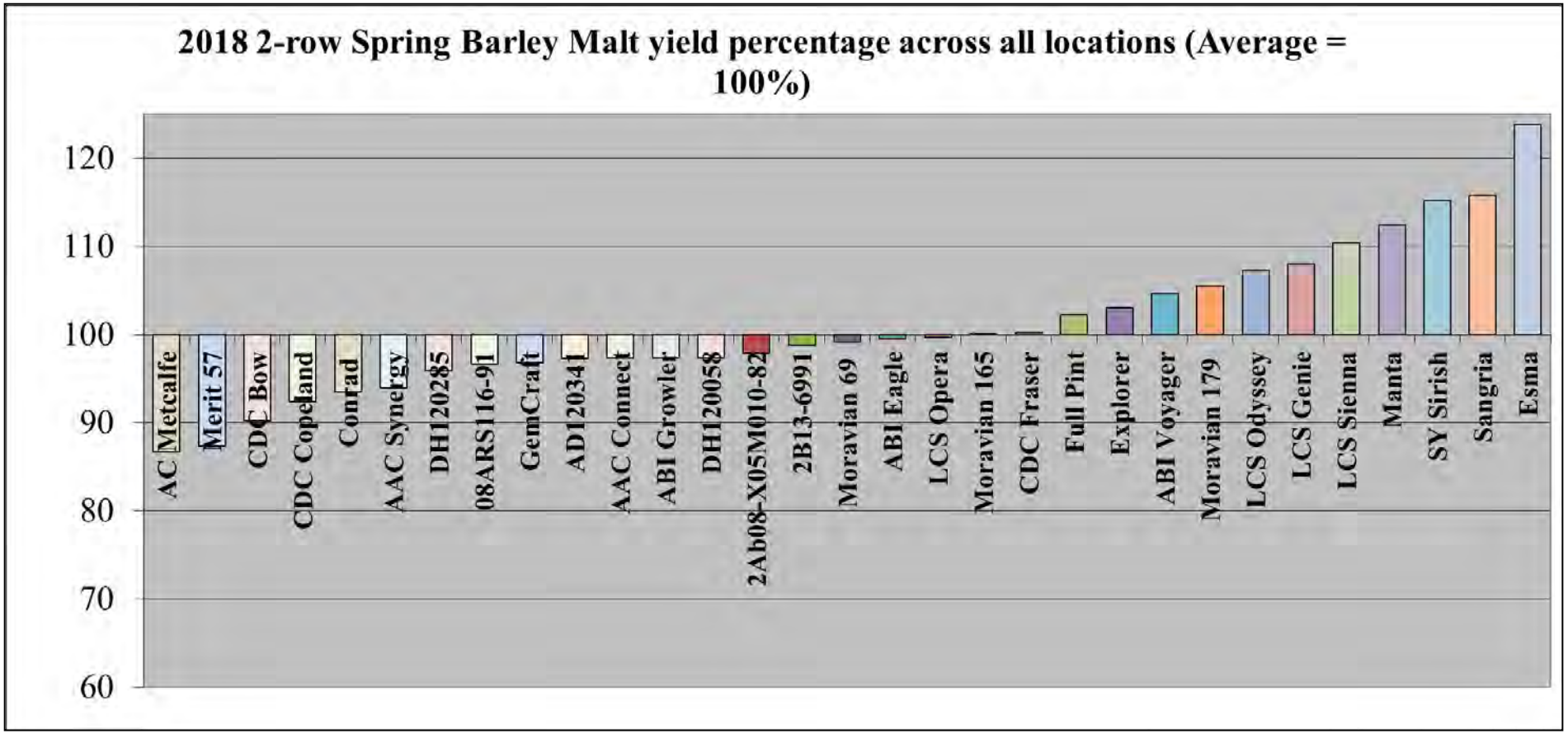


Chart 7. 2-Row Spring Malt Barley Yield Percentage Across All Locations.

Table 59. 2-Row Spring Feed Barley Irrigated Nurseries, 3-Year Averages (2016-2018; 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
UTSB10905-72 (SB6)	147.1	51.0	100	6/16	36	5	10.9	94.7	3.9	1.9
Altorado	147.0	54.1	100	6/21	32	10	10.7	91.5	5.9	3.1
Oreana	145.4	52.8	99	6/24	28	14	11.0	85.9	9.1	5.4
Claymore	143.5	52.2	100	6/22	33	18	10.6	88.0	7.5	5.1
Millennium (SB6)	143.0	50.2	99	6/16	35	5	10.8	82.9	11.5	6.3
Xena	138.3	53.2	100	6/21	33	17	11.0	90.3	6.1	4.2
Champion	135.9	54.2	100	6/20	33	15	11.2	91.6	4.9	3.3
Lenetah	134.1	53.2	99	6/18	34	21	11.1	90.5	5.7	4.5
Idagold II	129.7	53.0	99	6/22	30	7	11.1	87.6	8.9	4.3
Kardia	126.7	50.9	100	6/24	34	26	11.3	82.7	10.2	7.8
Julie*	119.6	57.6	99	6/24	33	8	12.8	89.0	7.4	4.1
Transit*	103.8	57.1	99	6/23	34	10	12.6	85.4	10.7	4.4
Goldenhart*	101.9	60.3	97	6/22	32	21	14.4	90.6	6.6	3.1
Average	132.0	53.8	99	6/21	33	14	11.5	88.5	7.6	4.4
LSD (α =.05)	5.4	0.5	0.7	2.9	1.1	7.1	0.6	3.9	2.7	2.0
CV%	10.1	2.2	1.7	4.2	7.6	124.4	6.9	5.4	43.8	54.8
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

*indicates hulless variety

(SB6) = 6-row barley

Table 60. Irrigated 2-Row Spring Feed Barley Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2018.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)	Plumps (>6/64)	Plumps (>5.5/64)	% Thin
Altorado	151.3	54.4	100	6/19	36	1	10.8	93.8	4.2	2.1
Oreana	144.0	52.6	99	6/22	32	11	11.2	81.8	10.9	7.4
Millennium (SB6)	142.3	49.9	100	6/14	37	9	11.0	76.7	14.8	8.5
UT11302-11 (SB6)	138.4	49.8	100	6/15	37	16	11.0	89.3	7.5	3.6
Champion	137.1	54.3	100	6/17	37	15	11.6	90.8	5.8	3.7
UTSB10905-72 (SB6)	136.7	50.6	100	6/15	40	8	10.9	92.5	4.8	2.6
Claymore	135.3	51.7	100	6/20	36	15	10.8	83.8	9.6	6.8
Xena	132.1	52.7	100	6/19	36	12	11.3	85.9	8.3	6.3
YU510-510 (SB6)	132.1	48.4	100	6/19	29	2	10.5	84.8	10.2	5.6
Lenetah	128.2	53.0	99	6/18	39	31	11.4	87.2	7.4	6.1
Julie*	123.3	56.4	100	6/21	36	12	11.5	88.9	7.4	4.1
Idagold II	122.6	53.1	99	6/19	34	4	11.2	82.0	13.8	4.5
Kardia	121.5	50.5	100	6/23	37	25	11.4	77.8	12.6	10.1
Transit*	116.8	55.6	100	6/21	37	3	11.0	89.4	7.2	3.6
Goldenhart*	96.2	59.9	96	6/22	37	20	14.8	91.0	6.1	3.2
Average	130.5	52.9	100	6/19	36	12	11.4	86.4	8.7	5.2
LSD (α = .05)	10.6	0.9	0.9	1.6	2.9	15.6	0.7	8.1	5.8	4.2
CV%	11.7	2.3	1.3	1.3	10.0	156.4	4.5	6.5	46.4	56.4
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	0.0045	<.0001	0.0012	0.0105	0.0113

* indicates hulless variety

(SB6)= 6-row barley

Table 61. Agronomic Data for Spring Feed and Food Barley at Rupert, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (>6/64)	(>5.5/64)	% Thin
2-Row Spring Feed Barley												
Millennium (SB6)	165.7	144.9	171.9	51.0	100	6/6	33	4	11.1	82.5	10.0	5.8
Oreana	157.6	151.5	170.5	54.1	100	6/14	31	11	11.1	92.6	3.7	1.9
YU510-510 (SB6)	---	141.5	165.2	50.4	100	6/13	32	3	10.1	92.1	5.5	1.7
Claymore	163.8	153.4	162.5	53.6	100	6/14	31	14	10.8	95.6	3.0	1.8
UTSB10905-72 (SB6)	153.3	148.9	152.3	51.9	100	6/7	36	23	10.9	94.9	2.9	1.2
Xena	149.8	146.2	149.9	54.0	100	6/12	33	12	11.0	94.6	2.6	1.8
UT11302-11 (SB6)	---	---	145.1	50.6	100	6/7	34	31	11.3	88.5	7.5	2.8
Altorado	156.7	141.7	141.9	54.8	100	6/13	33	1	10.8	95.6	2.7	1.9
Champion	133.9	122.9	138.7	54.5	100	6/11	34	23	11.5	95.1	3.2	1.8
Lenetah	151.2	132.9	137.0	54.3	100	6/13	34	28	11.4	97.6	1.8	1.4
Idagold II	157.0	135.4	130.7	53.9	100	6/12	31	4	11.0	94.0	3.6	2.8
Feed Average	154.3	141.9	151.4	53.0	100	6/11	33	14	11.0	93.0	4.2	2.3
2-Row Spring Food Barley												
Julie*	136.4	115.3	131.6	57.1	100	6/13	32	36	11.6	94.7	4.0	1.8
Kardia	150.5	122.7	128.6	51.5	100	6/15	34	64	11.3	87.7	8.3	4.5
Transit*	107.0	96.9	127.6	56.4	100	6/14	33	9	11.7	92.8	3.6	2.1
Goldenhart*	115.7	104.2	112.0	60.8	100	6/15	34	54	14.8	94.8	3.7	1.9
Food Average	127.4	109.8	125.0	56.4	100	6/14	33	41	12.3	92.5	4.9	2.6
LSD (α=.05)	13.3	20.1	18.6	0.7	0.0	0.8	6.1	29.9				
CV %	6.6	11.0	9.0	0.9	0.0	0.4	13.0	99.9				
Pr > F	<.0001	<.0001	<.0001	<.0001	.	<.0001	0.9501	0.0016				

* indicates hulless variety

(SB6) = Six-row barley

Table 62. Agronomic Data for Spring Feed and Food Barley, Aberdeen, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Protein (%)	Plump (>6/64)	(>5.5/64)	% Thin
2-Row Spring Feed Barley										
Altorado	182.2	151.4	174.1	55.5	100	6/13	11.4	96.4	2.1	1.5
YU510-510 (SB6)	---	157.7	162.9	49.9	100	6/14	10.3	89.9	7.2	3.4
Millennium (SB6)	180.0	170.2	157.8	49.8	100	6/12	11.1	68.7	18.6	13.2
Champion	156.3	149.9	156.5	54.4	100	6/12	13.1	88.2	6.7	5.0
Oreana	161.3	155.8	155.2	51.9	98	6/15	11.6	70.3	15.7	14.2
UT11302-11 (SB6)	---	---	152.4	49.5	100	6/12	11.1	87.5	8.1	4.9
Xena	150.8	158.9	143.9	53.3	100	6/14	11.5	89.2	7.0	4.4
UTSB10905-72 (SB6)	170.5	165.6	141.0	49.6	100	6/12	11.4	85.4	9.8	5.6
Claymore	138.7	162.5	140.1	51.6	100	6/15	11.2	77.1	13.1	10.3
Lenetah	149.0	150.4	137.7	52.9	100	6/13	12.1	73.0	14.5	13.2
Idagold II	155.3	151.8	116.0	53.2	98	6/14	11.7	64.3	33.1	2.7
Feed Average	160.5	157.4	148.9	51.9	99	6/13	11.5	80.9	12.4	7.1
2-Row Spring Food Barley										
Julie*	118.9	127.7	139.8	56.4	100	6/15	11.8	85.7	10.4	4.2
Transit*	104.8	102.9	131.3	55.3	100	6/15	11.4	86.8	8.8	4.9
Kardia	144.8	122.9	124.1	49.8	100	6/14	11.8	60.3	19.5	20.7
Goldenhart*	111.3	118.1	77.2	56.4	97	6/13	14.8	84.4	9.3	6.6
Food Average	120.0	117.9	118.1	54.5	99	6/14	12.5	79.3	12.0	9.1
LSD	19.8	14.4	22.3	2.2	2.3	3.6				
CV	9.9	7.5	11.0	2.9	1.6	1.5				
P>F	<.0001	<.0001	<.0001	<.0001	0.0901	0.4611				

* indicates hulless variety

(SB6) = Six-row barley

Table 63. Agronomic Data for Spring Feed and Food Barley at Idaho Falls, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (>6/64)	(>5.5/64)	% Thin
2-Row Spring Feed Barley												
Altorado	116.6	147.0	156.7	55.1	100	6/21	37	0	10.3	95.1	3.7	1.2
Oreana	118.7	156.9	145.2	53.6	100	6/24	32	23	10.6	87.2	10.2	3.5
Millennium (SB6)	123.0	176.5	143.0	50.6	100	6/14	39	25	10.7	79.0	14.2	7.1
YU510-510 (SB6)	---	166.3	138.9	48.6	100	6/24	34	3	11.1	82.4	13.3	5.4
Champion	117.6	137.8	137.3	55.5	100	6/16	38	21	10.5	96.0	3.2	1.1
UT11302-11 (SB6)	---	---	134.3	51.1	100	6/14	41	18	10.6	90.3	8.0	2.8
UTSB10905-72 (SB6)	135.5	203.8	133.4	51.5	100	6/13	44	3	10.4	95.7	3.3	1.5
Idagold II	112.3	132.5	131.9	54.3	100	6/18	35	6	10.7	92.2	5.1	3.2
Xena	135.9	134.7	129.6	52.5	100	6/21	40	24	11.6	82.3	8.0	10.7
Lenetah	124.9	138.4	126.7	53.8	100	6/17	41	54	11.1	92.0	4.9	3.8
Claymore	130.7	168.6	125.6	52.0	100	6/20	39	33	10.4	85.7	8.2	6.1
Feed Average	123.9	156.3	136.6	52.6	100	6/18	38	19	10.7	88.9	7.5	4.2
2-Row Spring Food Barley												
Julie*	107.6	123.2	130.5	57.1	100	6/23	37	0	9.7	94.1	4.4	1.6
Kardia	131.2	115.8	130.0	51.4	100	6/26	40	13	10.8	84.7	9.0	6.9
Transit*	90.0	109.1	119.6	56.3	100	6/21	38	1	9.8	94.8	4.6	1.7
Goldenhart*	100.8	115.2	105.9	61.6	95	6/25	39	1	14.3	91.9	6.8	1.7
Food Average	107.4	115.8	121.5	56.6	99	6/24	38	4	11.1	91.4	6.2	3.0
LSD (α=.05)	16.8	19.5	16.3	1.7	0.0	5.2	5.4	35.9				
CV %	10.4	10.4	8.6	2.2	0.0	2.1	10.0	170.5				
Pr > F	<.0001	<.0001	0.0002	<.0001	<.0001	<.0001	0.0084	0.1589				

* indicates hulless variety

(SB6) = Six-row barley

Table 64. Agronomic Data for Spring Feed and Food Barley at Ashton, Irrigated, 2018.

Variety	Yield (bu/A) 2016	2017	2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (>6/64)	(>5.5/64)	% Thin
2-Row Spring Feed Barley												
Altorado	138.8	124.2	132.4	52.4	100	6/30	37	1	10.6	88.0	8.4	3.6
UT11302-11 (SB6)	---	---	121.8	48.2	100	6/26	36	0	11.2	90.9	6.3	3.9
Champion	137.9	126.3	120.7	53.0	100	6/27	38	1	11.3	83.8	10.2	6.8
UTSB10905-72 (SB6)	114.0	126.7	120.2	49.6	100	6/27	40	0	10.8	93.8	3.3	2.0
Claymore	130.6	132.1	113.0	49.6	100	7/2	39	0	10.6	76.8	14.1	9.1
Idagold II	120.8	101.6	111.7	51.0	100	7/1	36	0	11.5	77.6	13.4	9.1
Lenetah	131.0	118.2	111.6	51.1	96	7/1	43	13	11.1	86.1	8.2	6.0
Oreana	149.2	117.9	105.3	50.9	100	7/4	32	1	11.6	76.9	14.0	9.8
Xena	138.0	117.2	105.1	51.2	100	7/1	37	0	11.1	77.4	15.5	8.1
Millennium (SB6)	117.2	119.4	96.7	48.1	100	6/26	40	0	11.1	76.4	16.2	7.8
YU510-510 (SB6)	---	100.2	61.2	44.8	100	6/27	22	0	10.6	74.9	14.6	11.7
Feed Average	130.9	118.4	109.1	50.0	100	6/29	36	1	11.0	82.1	11.3	7.1
2-Row Spring Food Barley												
Kardia	123.8	122.3	103.4	49.5	99	7/7	39	0	11.7	78.6	13.6	8.4
Julie*	106.5	105.9	91.3	55.0	100	7/5	38	0	13.1	80.9	10.6	8.6
Goldenhart*	99.3	78.4	89.7	61.0	93	7/4	37	6	15.3	92.9	4.6	2.6
Transit*	84.6	83.3	88.7	54.7	99	7/6	40	0	11.1	83.2	11.6	5.5
Food Average	103.5	97.5	93.3	55.0	98	7/5	38	2	12.8	83.9	10.1	6.3
LSD (α=.05)	14.1	15.1	28.1	2.1	2.7	1.3	3.5	10.0				
CV %	8.2	9.7	18.8	2.9	1.9	0.5	6.7	517.0				
Pr > F	<.0001	<.0001	0.0018	<.0001	0.0004	<.0001	<.0001	0.4802				

* indicates hulless variety

(SB6) = Six-row barley

Table 65. Agronomic Data for Spring Barley at Soda Springs, Dryland, 2018.

Variety	Yield (bu/A) 2018	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (>6/64)	Plump (>5.5/64)	% Thin
2-Row Spring Feed Barley										
Lenetah	71.4	47.2	94	7/6	31	0	11.2	75.2	17.6	7.5
Oreana	70.1	49.4	94	7/6	29	0	11.3	78.7	15.2	6.5
Millennium (SB6)	66.3	47.4	94	7/2	31	0	10.3	53.0	27.4	20.2
Idagold II	64.8	48.9	94	7/5	26	0	11.0	74.9	16.5	8.9
Champion	63.7	49.0	96	7/3	33	0	11.0	67.7	22.1	11.1
UTSB10905-72 (SB6)	63.2	46.1	94	7/3	31	0	10.6	82.4	12.6	5.4
Xena	58.1	48.4	89	7/4	31	0	10.8	70.6	21.3	8.6
Claymore	56.8	46.9	94	7/4	32	0	10.8	72.4	17.0	11.7
YU510-510 (SB6)	30.2	43.0	95	7/6	22	0	10.7	57.1	25.9	17.7
Average	60.5	47.4	94	7/4	30	0	10.9	70.2	19.5	10.8
LSD (α=.05)	14.5	1.4	3	1	5	0				
CV %	15.8	2.0	2.5	0.5	10.4	.				
Pr > F	0.0002	<.0001	0.0214	<.0001	0.0016	.				
1-rep demonstration plots										
Altorado	95.9	49.3	95.0	186.0	27.0	0	11.1	59.5	24.8	10.8

(SB6) = Six-row barley

Table 66. 2-Row Spring Feed Barley Yield Percentage of Location Averages, 2018.

	(100% =Average)					Variety
Variety	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**
Altorado	124	98	118	126	---	117
Oreana	110	118	109	100	116	111
Millennium (SB6)	112	119	108	92	110	108
UT11302-11 (SB6)	108	100	101	116	---	107
Champion	111	96	104	115	105	106
UTSB10905-72 (SB6)	100	106	101	115	104	105
Lenetah	98	95	96	106	118	103
Claymore	100	113	95	108	94	102
Xena	102	104	98	100	96	100
Idagold II	82	91	100	107	107	97
Julie*	99	91	98	87	---	94
Kardia	88	89	98	99	---	94
Transit*	93	88	90	85	---	89
YU510-510 (SB6)	116	114	105	58	50	89
Goldenhart*	55	78	80	86	---	74
Location Average (bu/A)	141	144	133	105	61	

* indicates hulless variety

2018 Spring Feed and Food Barley Yield Percentage Across All Locations

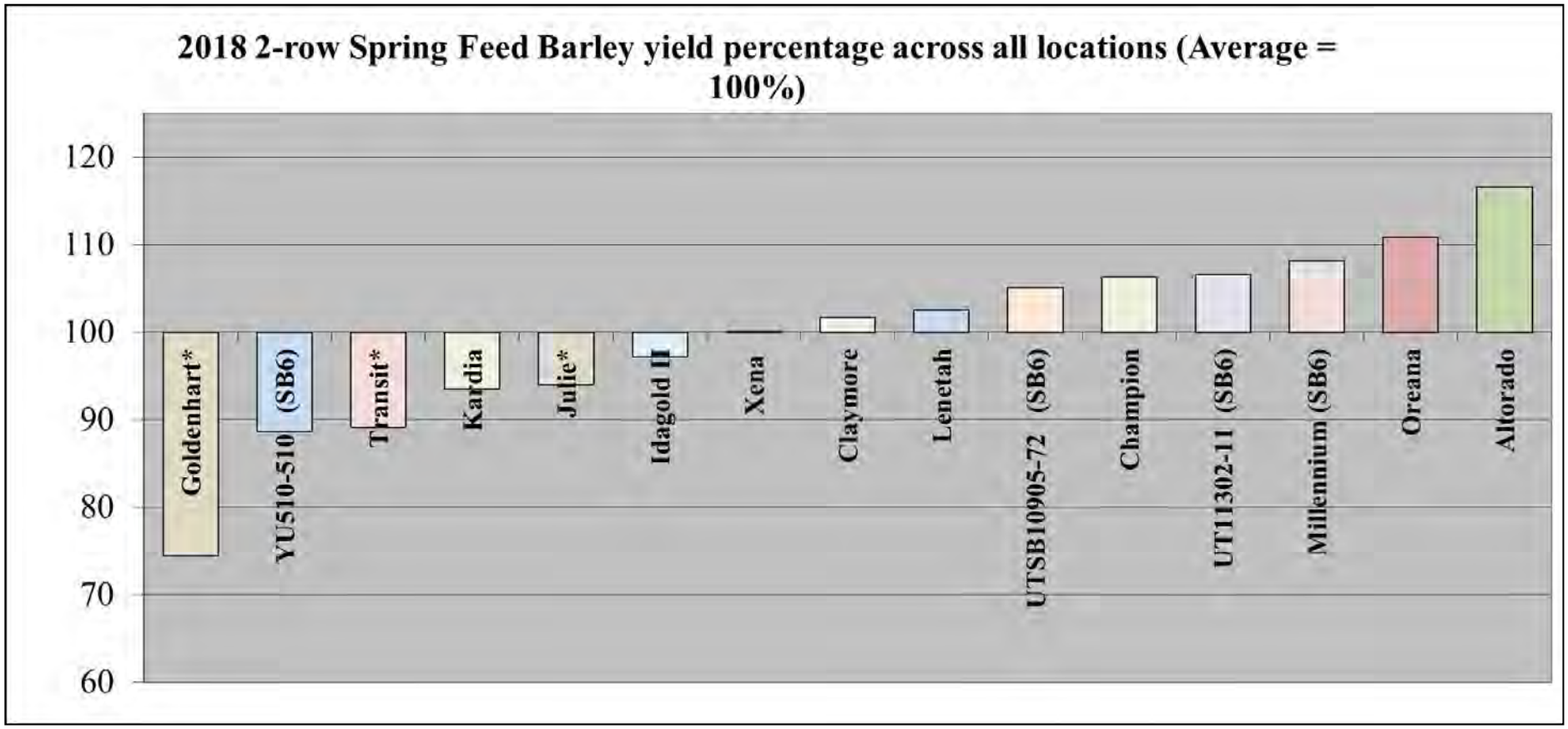


Chart 8. 2-Row Spring Feed Barley Yield Percentage Across All Locations.
*indicates hulless variety.
(SB6) = 6-row barley.

Table 67. Hard Winter Wheat Grain Protein & Kernel Hardness, 2017.

	----------Grain Protein %----------							----------Kernel Hardness 0-100----------						
Variety	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Rockland**	**Soda Springs**	**Average**	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Rockland**	**Soda Springs**	**Average**
Greenville	10.5	11.2	10.6	10.3	8.9	9.9	**10.2**	83	79	86	78	77	72	**79.2**
IDO1101 (W)	9.7	11.7	10.6	10.1	7.0	9.4	**9.8**	90	89	95	92	85	85	**89.3**
IDO1506 (W)	9.9	11.3	10.6	10.0	7.5	9.6	**9.8**	86	88	90	85	79	85	**85.5**
Keldin (QC)	10.2	11.1	10.5	10.3	7.8	10.1	**10.0**	86	85	91	85	85	75	**84.5**
Keldin	10.0	10.9	10.8	9.3	7.2	10.0	**9.7**	82	86	92	86	81	75	**83.7**
LCI 13DH14-53 (W)	10.5	10.2	10.8	10.9	8.8	9.6	**10.1**	90	84	95	91	93	79	**88.7**
LCS Yeti (W)	11.2	11.5	11.6	10.8	8.8	10.7	**10.8**	78	85	88	84	82	78	**82.5**
LCS Jet	10.1	11.1	9.8	8.1	6.9	10.0	**9.3**	89	86	93	81	74	77	**83.3**
Loma	10.4	11.6	10.6	10.7	8.2	9.9	**10.2**	89	93	93	88	83	90	**89.3**
Mandala	10.8	11.5	10.8	11.0	8.2	10.8	**10.5**	83	86	88	87	85	78	**84.5**
Metropolis	11.2	12.0	11.0	11.1	8.6	10.4	**10.7**	88	91	94	87	83	81	**87.3**
Northern	10.3	11.5	10.4	10.5	8.0	10.3	**10.2**	98	96	100	95	85	89	**93.8**
Norwest 553	10.1	11.3	9.9	10.1	8.7	10.1	**10.0**	80	87	84	87	81	77	**82.7**
LCS Rocket	9.8	11.2	8.9	8.8	6.7	9.9	**9.2**	91	89	98	88	69	83	**86.3**
Irv (W)	11.1	11.7	10.6	10.3	7.9	11.0	**10.4**	93	99	94	91	81	82	**90.0**
OR2111025 (W)	10.3	11.5	10.9	10.0	8.7	10.8	**10.4**	83	91	96	86	80	83	**86.5**
OR2120070R	9.9	11.0	10.7	10.1	7.9	10.1	**10.0**	82	80	88	85	74	79	**81.3**
OR2120276H (W)	10.5	11.1	10.4	10.8	8.6	10.6	**10.3**	83	85	91	88	83	83	**85.5**
OR2130021R	10.8	11.5	10.4	10.8	7.6	10.7	**10.3**	94	96	94	91	83	81	**89.8**
OR2130118H (W)	9.9	11.1	10.4	10.8	8.2	10.8	**10.2**	83	85	90	83	76	80	**82.8**
Rebelde	11.3	11.9	11.9	11.3	9.9	10.8	**11.2**	82	84	92	86	85	81	**85.0**
SY Touchstone (W)	10.5	11.6	10.5	11.0	---	10.2	**10.8**	87	92	93	90	---	83	**89.0**
Utah 100	10.3	11.2	10.0	9.9	7.4	11.0	**10.0**	99	100	99	92	82	96	**94.7**
WA 8267 (W)	9.8	11.9	10.3	9.5	7.1	9.4	**9.7**	83	80	86	76	66	73	**77.3**
WA8252 (W)	9.9	10.9	9.8	9.7	7.5	9.1	**9.5**	88	88	95	83	70	79	**83.8**
Warhorse	11.3	12.3	11.1	11.1	9.2	11.8	**11.1**	87	94	92	85	89	87	**89.0**
XA4601	11.3	11.6	14.0	10.3	8.4	10.6	**11.0**	81	85	80	79	73	75	**78.8**
XA4104	11.4	11.6	11.2	10.1	7.5	10.4	**10.4**	90	92	90	86	75	80	**85.5**
XA4103	10.7	11.5	10.8	9.7	7.6	10.4	**10.1**	100	99	100	100	90	95	**97.3**
XA3101 (W)	10.2	11.2	10.8	9.8	7.7	9.4	**9.9**	88	89	94	85	80	77	**85.5**
WB3768 (W)	10.1	11.7	10.4	10.3	7.8	9.9	**10.0**	91	94	95	89	82	90	**90.2**
WB4303	10.7	11.6	10.2	10.5	7.8	10.0	**10.1**	86	90	91	92	82	82	**87.2**
WB4623CLP	11.6	12.0	11.2	10.2	8.8	10.7	**10.8**	82	85	85	83	80	73	**81.3**
Whetstone	11.1	12.2	10.7	10.8	8.5	10.5	**10.6**	90	91	94	91	86	79	**88.5**
Yellowstone	10.2	10.9	10.7	10.8	7.7	10.3	**10.1**	87	88	92	89	79	85	**86.7**
WB-Arrowhead/Keldin	10.6	11.7	10.3	10.3	7.6	9.5	**10.0**	86	88	91	85	82	79	**85.2**
MT1332	10.3	11.2	10.6	10.6	9.2	10.3	**10.4**	91	88	92	89	84	82	**87.7**
MT1348	10.2	10.9	10.4	10.1	7.8	10.2	**9.9**	91	94	94	85	79	92	**89.2**
Norwest 553/Yellowstone	10.3	11.4	10.3	10.3	7.9	10.4	**10.1**	86	91	87	82	78	85	**84.8**
Keldin + 11-52-0	9.9	11.2	10.2	10.2	7.5	9.9	**9.8**	88	86	89	83	79	74	**83.2**
Bearpaw	---	---	---	10.5	8.3	11.4	**10.1**	---	---	---	93	78	82	**84.3**
Curlew	---	---	---	10.9	7.5	10.0	**9.5**	---	---	---	90	83	84	**85.7**
Deloris	---	---	---	10.8	7.4	10.2	**9.5**	---	---	---	85	82	85	**84.0**
Eltan (SWW)	---	---	---	9.0	6.7	9.6	**8.4**	---	---	---	34	28	27	**29.7**
Golden Spike (W)	---	---	---	9.6	7.4	9.5	**8.8**	---	---	---	81	66	78	**75.0**
Juniper	---	---	---	10.7	7.8	10.4	**9.6**	---	---	---	94	89	94	**92.3**
Lucin-CL	---	---	---	10.6	8.1	11.0	**9.9**	---	---	---	88	88	88	**88.0**
LCI13DH14-83 (W)	---	---	---	11.5	8.4	10.0	**10.0**	---	---	---	93	88	81	**87.3**
Promontory	---	---	---	10.2	7.6	10.1	**9.3**	---	---	---	91	78	86	**85.0**
UI SRG	---	---	---	10.1	8.0	9.8	**9.3**	---	---	---	98	86	91	**91.7**
UICF Grace (W)	---	---	---	9.8	7.2	10.2	**9.1**	---	---	---	88	86	92	**88.7**
UI Silver (W)	---	---	---	9.4	7.4	10.0	**8.9**	---	---	---	92	75	95	**87.3**
LCI 13DH04-16 (W)	---	---	---	10.4	7.9	10.1	**9.5**	---	---	---	89	85	83	**85.7**
SY Clearstone 2CL	---	---	---	10.1	7.9	9.8	**9.3**	---	---	---	91	77	78	**82.0**
Location Average	**10.5**	**11.4**	**10.6**	**10.3**	**7.9**	**10.2**	**10.0**	**87.4**	**89.0**	**91.8**	**86.6**	**79.8**	**81.5**	**85.1**

(W) = White

(SWW) = Soft White Winter

(QC) = Double entry for data quality analysis

Table 68. Percent Flour Protein and Flour Yield for Hard Winter Wheat at Aberdeen, Kimberly, Ririe, Rockland, and Soda Springs, 2017.

	Flour Protein (14% mb)							Flour Yield (%)						
Variety	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Rockland**	**Soda Springs**	**Average**	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Rockland**	**Soda Springs**	**Average**
Hard Red Winter Wheat														
Greenville	10.1	10.4	10.6	10.4	8.6	9.5	**9.9**	53.3	55.1	55.6	55.7	49.7	51.0	**53.4**
Keldin (QC)	9.9	10.7	11.5	11.4	7.4	9.7	**10.1**	58.8	59.9	60.3	58.3	55.9	55.8	**58.2**
Keldin	9.9	10.8	10.5	9.8	7.1	10.1	**9.7**	59.3	59.8	59.3	59.2	56.3	55.1	**58.2**
LCS Jet	9.5	10.8	9.7	8.1	6.5	9.7	**9.1**	58.4	57.9	58.8	57.1	55.6	54.0	**57.0**
Loma	10.6	11.2	10.5	11.4	8.4	9.9	**10.3**	60.8	60.5	61.3	59.8	57.3	56.9	**59.4**
Mandala	10.6	10.9	12.0	10.7	7.8	10.4	**10.4**	53.9	55.5	55.6	53.4	48.2	50.0	**52.8**
Metropolis	12.0	11.7	11.8	12.1	8.4	10.9	**11.2**	60.4	61.2	60.4	59.4	55.0	55.4	**58.6**
Northern	10.8	11.2	11.0	11.2	7.8	10.6	**10.4**	55.4	55.3	56.9	55.0	52.9	52.6	**54.7**
Norwest 553	10.2	10.2	10.6	10.5	8.6	9.8	**10.0**	59.0	59.8	60.8	60.0	57.1	56.1	**58.8**
LCS Rocket	9.5	10.3	8.9	8.9	6.4	9.9	**9.0**	58.5	59.3	60.4	59.3	60.0	56.7	**59.0**
OR2120070R	9.8	10.1	10.3	10.2	8.0	9.9	**9.7**	56.8	59.2	59.6	57.2	54.0	54.1	**56.8**
OR2130021R	11.6	11.6	10.6	10.8	7.6	10.9	**10.5**	58.3	60.3	59.5	58.8	57.5	56.1	**58.4**
Rebelde	11.9	13.3	12.2	12.5	9.9	11.7	**11.9**	59.1	61.2	60.4	58.8	53.9	55.9	**58.2**
Utah 100	10.4	10.7	10.1	10.2	7.1	9.5	**9.7**	57.0	59.4	58.7	55.6	55.1	52.7	**56.4**
Warhorse	11.6	12.4	11.9	11.2	9.4	11.9	**11.4**	54.5	56.3	56.3	53.4	52.3	52.4	**54.2**
XA4601	11.7	13.0	11.4	10.8	8.4	11.0	**11.1**	58.0	60.7	60.1	57.0	54.6	54.6	**57.5**
XA4104	12.3	12.9	12.2	10.7	7.4	9.9	**10.9**	58.4	59.7	57.9	56.3	54.6	57.3	**57.4**
XA4103	10.9	11.9	10.4	10.2	7.4	9.9	**10.1**	56.7	57.2	55.4	55.9	52.3	57.8	**55.9**
WB4303	10.5	12.1	10.3	11.0	7.8	10.0	**10.3**	55.5	58.4	54.9	53.0	50.7	55.9	**54.8**
WB4623CLP	12.3	12.9	12.1	11.0	9.3	10.2	**11.3**	55.8	58.1	53.0	53.3	49.6	55.2	**54.2**
Whetstone	11.7	13.3	10.6	11.1	8.2	10.9	**11.0**	58.2	60.2	56.6	57.3	53.7	57.8	**57.3**
Yellowstone	10.1	10.7	11.2	10.9	7.7	10.2	**10.1**	60.0	61.5	58.7	57.9	55.7	58.5	**58.7**
WB-Arrowhead/Keldin	11.2	12.2	11.0	11.2	7.6	9.2	**10.4**	58.3	62.5	58.0	57.7	55.1	57.4	**58.2**
MT1332	10.5	11.7	11.0	11.2	8.7	10.3	**10.6**	59.6	60.3	56.9	56.9	54.1	57.1	**57.5**
MT1348	9.8	11.2	11.2	10.6	7.8	10.5	**10.2**	59.2	59.6	55.1	55.0	51.4	55.8	**56.0**
Norwest 553/Yellowstone	10.4	11.3	10.7	10.9	8.0	10.1	**10.2**	60.2	60.0	58.1	58.3	56.5	58.2	**58.5**
Keldin + 11-52-0	10.9	11.7	10.4	10.9	7.7	9.8	**10.2**	59.2	59.5	56.4	57.3	54.3	57.6	**57.4**
Bearpaw	---	---	---	10.7	8.5	11.7	**10.3**	---	---	---	56.2	55.8	57.3	**56.4**
Curlew	---	---	---	10.8	7.5	9.5	**9.3**	---	---	---	58.7	58.4	60.3	**59.1**
Deloris	---	---	---	12.0	6.8	9.8	**9.5**	---	---	---	60.6	58.4	58.9	**59.3**
Juniper	---	---	---	11.3	7.5	9.5	**9.4**	---	---	---	55.2	54.9	55.9	**55.3**
Lucin-CL	---	---	---	11.3	8.1	11.5	**10.3**	---	---	---	61.3	56.9	59.1	**59.1**
Promontory	---	---	---	11.5	7.6	9.9	**9.7**	---	---	---	59.0	57.1	60.0	**58.7**
UI SRG	---	---	---	10.2	7.5	8.6	**8.8**	---	---	---	57.2	54.6	56.3	**56.0**
SY Clearstone 2CL	---	---	---	10.4	7.9	9.1	**9.1**	---	---	---	57.0	55.2	54.7	**55.6**
Location Average	**10.8**	**11.5**	**10.9**	**10.8**	**7.9**	**10.2**	**10.2**	**57.9**	**59.2**	**58.0**	**57.2**	**54.7**	**56.0**	**57.1**
Hard White Winter Wheat														
IDO1101 (W)	9.5	11.3	10.2	10.1	6.6	9.0	**9.5**	58.8	60.0	58.8	57.5	52.8	55.5	**57.2**
IDO1506 (W)	10.2	11.7	11.2	10.3	7.4	9.5	**10.1**	60.9	61.7	61.6	59.8	59.2	58.6	**60.3**
LCI 13DH14-53 (W)	9.6	10.0	11.0	10.5	8.6	9.7	**9.9**	57.6	58.7	57.2	56.5	50.3	54.7	**55.8**
LCS Yeti (W)	10.7	10.8	11.8	12.4	9.5	11.0	**11.0**	60.2	61.1	60.3	58.4	55.5	56.0	**58.6**
Irv (W)	10.0	10.8	10.6	10.7	7.2	11.0	**10.1**	57.4	59.7	59.6	57.8	55.5	55.5	**57.6**
OR2111025 (W)	10.4	11.0	10.7	10.5	8.4	10.4	**10.2**	57.2	59.9	58.5	57.3	55.1	55.7	**57.3**
OR2120276H (W)	10.8	10.0	10.9	11.3	8.3	10.7	**10.3**	56.9	59.5	58.0	55.7	51.0	53.3	**55.7**
OR2130118H (W)	8.9	11.0	10.5	11.5	8.0	10.9	**10.1**	57.5	59.7	58.9	56.5	54.0	53.7	**56.7**
SY Touchstone	10.5	11.8	10.3	11.4	---	10.1	**10.8**	59.0	59.6	57.8	54.9	---	53.6	**57.0**
WA8252 (W)	9.9	12.2	9.5	9.7	7.2	9.3	**9.6**	56.9	57.9	57.3	55.1	55.4	53.7	**56.0**
WA 8267 (W)	9.7	12.1	10.2	9.4	7.1	9.4	**9.7**	56.7	55.9	57.1	56.3	56.3	53.1	**55.9**
XA3101 (W)	10.6	13.1	11.3	9.8	7.6	9.4	**10.3**	58.9	59.6	57.0	57.5	55.5	59.5	**58.0**
WB3768 (W)	10.1	12.2	10.8	10.8	7.9	9.0	**10.1**	58.2	59.7	57.3	55.5	52.8	57.7	**56.9**
Golden Spike (W)	---	---	---	10.2	7.1	9.0	**8.8**	---	---	---	59.5	60.7	59.7	**60.0**
LCI13DH14-83 (W)	---	---	---	11.1	8.5	10.6	**10.1**	---	---	---	56.7	52.0	57.3	**55.3**
UICF Grace (W)	---	---	---	8.6	7.0	9.4	**8.3**	---	---	---	52.5	47.9	51.2	**50.5**
UI Silver (W)	---	---	---	9.4	7.2	9.4	**8.7**	---	---	---	60.7	58.6	57.8	**59.0**
LCI 13DH04-16 (W)	---	---	---	10.9	7.9	9.7	**9.5**	---	---	---	59.1	56.0	57.3	**57.5**
Eltan (SWW)	---	---	---	9.1	5.9	9.5	**8.2**	---	---	---	63.5	65.4	59.9	**62.9**
Location Average	**10.1**	**11.4**	**10.7**	**10.4**	**7.7**	**9.9**	**9.7**	**57.9**	**59.2**	**58.1**	**57.3**	**55.1**	**55.9**	**57.1**

mb = moisture basis

(W) = White

(SWW) = Soft White Winter

(QC) = Double entry for data quality analysis

Table 69. Bake Volume for Hard Winter Wheat at Aberdeen, Kimberly, Rupert, Ririe, 2017.

	Bake Volume (cc)				
Variety	**Aberdeen**	**Kimberly**	**Rupert**	**Ririe**	**Average**
Hard Red Winter Wheat					
Greenville	1000	925	875	850	**913**
Keldin (QC)	1050	875	900	800	**906**
Keldin	950	825	875	775	**856**
LCS Jet	1075	800	800	750	**856**
Loma	1225	1000	825	1075	**1031**
Mandala	1100	900	950	850	**950**
Metropolis	1150	1050	1025	1025	**1063**
Northern	1150	950	1000	975	**1019**
Norwest 553	1000	925	1000	925	**963**
LCS Rocket	975	825	825	750	**844**
OR2120070R	975	875	900	850	**900**
OR2130021R	950	950	950	925	**944**
Rebelde	1200	1050	1100	1100	**1113**
Utah 100	1150	900	825	900	**944**
Warhorse	1150	1050	1025	925	**1038**
XA4601	1125	1000	900	---	**1008**
XA4104	1125	975	925	---	**1008**
XA4103	1050	875	825	---	**917**
WB4303	975	900	850	---	**908**
WB4623CLP	1300	1075	875	---	**1083**
Whetstone	1100	1025	875	---	**1000**
Yellowstone	1000	950	950	---	**967**
WB-Arrowhead/Keldin	950	1000	875	---	**942**
MT1332	975	1000	925	---	**967**
MT1348	950	925	900	---	**925**
Norwest 553/Yellowstone	950	975	900	---	**942**
Keldin + 11-52-0	950	925	850	---	**908**
Location Average	**1057**	**945**	**908**	**898**	**960**
Hard White Winter Wheat					
IDO1101 (W)	950	800	900	775	**856**
IDO1506 (W)	975	825	950	850	**900**
LCI 13DH14-53 (W)	975	800	950	950	**919**
LCS Yeti (W)	1000	975	1125	1050	**1038**
Irv (W)	1075	850	925	825	**919**
SY Touchstone (W)	1050	875	750	850	**881**
OR2111025 (W)	1000	850	950	725	**881**
OR2120276H (W)	1050	950	975	1000	**994**
OR2130118H (W)	1025	850	850	925	**913**
WA 8267 (W)	1025	875	775	775	**863**
WA8252 (W)	1000	825	700	625	**788**
XA3101 (W)	950	925	925	---	**933**
WB3768 (W)	1025	900	850	---	**925**
Location Average	**1008**	**869**	**894**	**850**	**908**

(W) = White

(SWW) = Soft White Winter

(QC) = Double entry for data quality analysis

Table 70. Soft White Winter Wheat Grain Protein & Kernel Hardness, 2017.

	--------Grain Protein %--------							--------Kernel Hardness 0-100--------						
Variety	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Soda Springs**	**Rockland**	**Average**	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Soda Springs**	**Rockland**	**Average**
Bobtail	8.7	9.1	8.0	8.1	8.2	---	**8.4**	21	34	27	31	35	---	**29.6**
Brundage	9.8	9.6	7.8	9.1	---	---	**9.1**	28	34	34	33	---	---	**32.3**
Bruneau	9.4	9.5	7.1	8.6	9.2	---	**8.8**	24	31	26	31	35	---	**29.4**
IDN-01-10704A	9.0	9.5	7.2	8.7	8.4	---	**8.6**	32	41	35	39	44	---	**38.2**
IDN-02-29001A	9.0	10.3	7.8	---	---	---	**9.0**	26	34	33	---	---	---	**31.0**
IDN06-03303B	10.2	9.5	7.0	---	---	---	**8.9**	26	31	29	---	---	---	**28.7**
IDN09-08357A	9.4	9.7	7.6	---	---	---	**8.9**	23	30	27	---	---	---	**26.7**
IDN07-28017B	9.5	9.9	8.2	9.9	9.2	---	**9.3**	24	30	25	34	36	---	**29.8**
Jasper	8.9	10.6	8.4	8.4	9.1	8.7	**9.0**	27	28	28	33	28	24	**28.0**
LCS Artdeco	9.2	8.7	7.1	9.0	8.4	---	**8.5**	24	30	26	37	24	---	**28.2**
LCS Drive	9.8	9.6	7.9	---	---	---	**9.1**	30	33	35	---	---	---	**32.7**
LCS Shark	10.5	9.8	8.4	---	---	---	**9.6**	32	41	40	---	---	---	**37.7**
LCS Hulk	10.3	10.4	7.7	8.8	9.2	---	**9.3**	23	30	33	33	26	---	**29.0**
UI Sparrow (QC)	8.7	10.0	7.8	8.5	9.6	---	**8.9**	28	40	33	35	36	---	**34.4**
Norwest Duet	11.0	9.9	8.2	8.8	---	---	**9.5**	40	44	44	41	---	---	**42.3**
Norwest Tandem	9.6	9.9	8.2	9.0	8.5	---	**9.0**	33	40	42	38	33	---	**37.2**
OR2101043	10.1	9.5	7.6	8.6	---	---	**9.0**	29	35	33	33	---	---	**32.5**
OR2121086	9.9	9.0	7.8	10.1	---	---	**9.2**	30	33	37	38	---	---	**34.5**
ORI2150033CF+	11.3	10.5	9.1	9.7	10.4	---	**10.2**	27	29	36	38	34	---	**32.8**
ORI2150031CF+	10.3	10.3	8.6	9.8	10.0	---	**9.8**	27	33	36	39	33	---	**33.6**
Stephens	9.7	9.6	7.7	9.2	8.6	---	**9.0**	27	37	31	37	30	---	**32.4**
SY Ovation	9.0	9.3	7.7	8.9	9.6	---	**8.9**	27	37	39	40	35	---	**35.6**
SY Assure	10.0	9.8	8.8	---	---	---	**9.5**	30	34	36	---	---	---	**33.3**
SY Dayton	9.8	9.3	8.4	---	---	---	**9.2**	27	32	37	---	---	---	**32.0**
UI Castle CL+	10.2	10.7	8.2	10.4	10.3	---	**10.0**	31	34	31	33	35	---	**32.8**
UI Magic CL+	10.1	9.8	8.1	9.5	9.1	---	**9.3**	32	38	35	40	33	---	**35.6**
UI Palouse	9.3	10.4	8.1	9.0	8.8	---	**9.1**	23	29	30	30	26	---	**27.6**
UI Sparrow	9.2	10.2	7.5	8.1	8.4	---	**8.7**	33	33	34	34	36	---	**34.0**
UI-WSU Huffman	10.0	9.7	7.6	9	9.3	---	**9.1**	31	34	33	37	35	---	**34.0**
WA8232	9.1	10	7.8	8.2	8.6	9.6	**8.9**	30	32	36	34	27	32	**31.8**
WA8234	10.1	9.4	8	9.1	8.6	9.0	**9.0**	36	38	38	40	33	36	**36.8**
WB 456	9.6	10.2	8.7	---	---	---	**9.5**	35	40	41	---	---	---	**38.7**
XA1401	13.9	11.8	11.6	10.6	11.2	---	**11.8**	47	48	53	53	50	---	**50.2**
XA1101	12.2	11	9.4	10.1	11.1	---	**10.8**	41	40	46	46	38	---	**42.2**
WB-528	9.7	9.7	8.8	---	---	---	**9.4**	32	41	35	---	---	---	**36.0**
WB1070CL	10.6	10.6	8.4	10.3	10.0	---	**10.0**	29	38	36	40	28	---	**34.2**
WB1376CLP	10.4	9.9	9.5	10.2	11.5	---	**10.3**	47	38	43	38	36	---	**40.4**
WB1529	10.7	9.7	8.6	9.1	9.1	---	**9.4**	32	35	36	36	27	---	**33.2**
WB1604	9.9	9.7	7.9	---	9.5	10.7	**9.5**	31	36	32	---	28	30	**31.4**
WB1783	10.1	9.9	8.2	9.3	9.1	9.0	**9.3**	38	40	42	44	42	32	**39.7**
LWW14-73161	---	---	---	9.0	10.0	9.1	**9.4**	---	---	---	34	27	25	**28.7**
Otto	---	---	---	8.7	9.3	---	**9.0**	---	---	---	35	33	---	**34.0**
SY Banks	---	---	---	8.9	9.3	---	**9.1**	---	---	---	39	32	---	**35.5**
SY Command	---	---	---	8.4	8.3	---	**8.4**	---	---	---	33	29	---	**31.0**
Eltan	---	---	---	9.1	8.8	---	**9.0**	---	---	---	31	32	---	**31.5**
Average	**10.0**	**9.9**	**8.2**	**9.1**	**9.3**	**9.4**	**9.3**	**30.3**	**35.4**	**35.1**	**36.8**	**33.0**	**29.8**	**33.8**

Table 71. Percent Flour Protein and Flour Yield for Soft White Winter Wheat at Kimberly, Ririe, and Aberdeen, 2017.

	Flour Protein (%)							Flour Yield (%)						
Variety	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Soda Springs**	**Rockland**	**Average**	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Soda Springs**	**Rockland**	**Average**
Bobtail	6.3	8.9	8.2	7.5	7.8	---	**7.7**	69.7	68.2	69.6	67.7	66.0	---	**68.2**
Brundage	7.2	9.3	7.7	7.9	---	---	**8.0**	66.4	65.2	66.8	66.1	---	---	**66.1**
Bruneau	6.7	9.7	7.1	8.5	8.8	---	**8.2**	65.7	65.3	66.9	65.4	60.9	---	**64.8**
IDN-01-10704A	6.5	8.9	7.2	7.7	7.7	---	**7.6**	67.2	67.0	67.6	65.4	64.0	---	**66.2**
IDN-02-29001A	6.9	10.0	7.6	---	---	---	**8.2**	69.0	66.5	69.6	---	---	---	**68.4**
IDN06-03303B	7.5	9.4	7.3	---	---	---	**8.1**	66.0	65.6	67.0	---	---	---	**66.2**
IDN09-08357A	7.1	9.6	7.4	---	---	---	**8.0**	65.3	64.5	65.8	---	---	---	**65.2**
IDN07-28017B	6.8	9.7	8.3	8.4	8.7	---	**8.4**	67.9	64.8	67.0	66.9	63.6	---	**66.0**
Jasper	6.4	10.6	8.8	8.0	8.0	6.6	**8.1**	68.0	65.1	67.0	68.0	64.1	67.3	**66.6**
LCS Artdeco	6.9	9.1	7.4	8.5	7.9	---	**8.0**	65.4	63.3	65.8	62.4	59.7	---	**63.3**
LCS Drive	7.1	9.0	6.9	---	---	---	**7.7**	65.2	60.7	64.0	---	---	---	**63.3**
LCS Shark	7.9	9.7	7.7	---	---	---	**8.4**	65.3	63.1	65.5	---	---	---	**64.6**
LCS Hulk	8.1	10.5	7.1	8.2	8.5	---	**8.5**	66.9	62.8	66.3	66.4	61.9	---	**64.9**
UI Sparrow (QC)	5.9	10.1	6.7	7.5	8.5	---	**7.7**	63.7	62.4	63.9	65.1	61.3	---	**63.3**
Norwest Duet	7.6	9.8	7.0	7.9	---	---	**8.1**	66.0	58.5	66.3	65.6	---	---	**64.1**
Norwest Tandem	7.0	9.5	7.2	8.6	8.3	---	**8.1**	65.1	61.6	62.8	62.9	63.5	---	**63.2**
OR2101043	7.7	9.7	7.2	8.0	---	---	**8.2**	68.9	65.6	66.2	66.0	---	---	**66.7**
OR2121086	7.6	9.2	6.8	9.5	---	---	**8.3**	67.2	64.9	66.5	65.5	---	---	**66.0**
ORI2150033CF+	8.7	10.5	8.1	9.2	9.7	---	**9.2**	67.5	65.2	66.8	66.2	63.4	---	**65.8**
ORI2150031CF+	7.8	10.3	7.7	9.2	9.1	---	**8.8**	67.5	65.3	66.6	66.3	63.9	---	**65.9**
Stephens	7.6	9.5	6.9	8.6	8.4	---	**8.2**	65.7	63.9	64.2	66.0	62.7	---	**64.5**
SY Ovation	6.7	9.6	7.2	8.3	9.4	---	**8.2**	65.6	64.7	65.4	65.4	62.5	---	**64.7**
SY Assure	7.5	9.9	8.3	---	---	---	**8.6**	65.0	63.4	64.1	---	---	---	**64.2**
SY Dayton	7.5	9.1	7.6	---	---	---	**8.1**	66.2	63.7	64.9	---	---	---	**64.9**
UI Castle CL+	8.5	10.8	7.4	9.0	10.1	---	**9.2**	69.1	68.6	69.7	68.3	65.9	---	**68.3**
UI Magic CL+	8.1	9.8	7.3	8.9	8.4	---	**8.5**	64.1	65.1	65.9	64.2	61.6	---	**64.2**
UI Palouse	6.5	9.8	7.3	8.8	8.1	---	**8.1**	65.6	63.3	65.9	63.9	63.2	---	**64.4**
UI Sparrow	6.3	10.1	6.5	7.6	8.0	---	**7.7**	64.0	61.2	63.5	64.9	62.1	---	**63.1**
UI-WSU Huffman	7.6	9.9	6.7	8.4	8.8	---	**8.3**	66.1	70.4	66.5	64.2	62.9	---	**66.0**
WA8232	6.3	9.7	7.1	7.9	7.8	7.1	**7.7**	64.6	61.2	65.5	64.4	60.1	62.1	**63.0**
WA8234	7.4	9.4	7.1	8.5	7.9	6.5	**7.8**	64.6	61.9	66.3	62.8	62.7	61.4	**63.3**
WB 456	7.2	10.1	8.0	---	---	---	**8.4**	66.0	63.9	66.9	---	---	---	**65.6**
XA1401	11.2	11.6	10.0	9.6	9.8	---	**10.4**	60.8	56.2	61.5	59.5	56.2	---	**58.8**
XA1101	9.2	10.8	8.7	9.1	10.5	---	**9.7**	61.6	59.0	63.4	56.5	55.8	---	**59.2**
WB-528	7.2	9.9	7.8	---	---	---	**8.3**	64.6	64.7	66.5	---	---	---	**65.2**
WB1070CL	7.9	10.1	7.7	9.5	9.3	---	**8.9**	64.5	60.6	65.3	62.2	63.0	---	**63.1**
WB1376CLP	8.4	9.8	8.6	9.7	10.6	---	**9.4**	63.3	62.1	65.3	62.5	60.8	---	**62.8**
WB1529	8.2	9.8	7.9	8.3	8.7	---	**8.6**	68.0	62.6	62.8	63.6	60.4	---	**63.5**
WB1604	7.7	9.9	7.5	---	9.0	8.2	**8.5**	65.6	63.9	64.8	---	63.9	61.0	**63.9**
WB1783	7.7	9.8	7.5	8.5	8.2	---	**8.3**	64.6	63.0	64.2	65.5	63.6	---	**64.2**
LWW14-73161	---	---	---	8.1	9.3	---	**8.7**	---	---	---	67.4	62.7	---	**65.1**
Otto	---	---	---	8.2	8.5	---	**8.4**	---	---	---	65.0	62.5	---	**63.7**
SY Banks	---	---	---	8.0	8.2	6.6	**7.6**	---	---	---	65.4	60.5	63.0	**63.0**
SY Command	---	---	---	7.5	7.0	6.7	**7.1**	---	---	---	64.7	61.6	62.5	**63.0**
Eltan	---	---	---	8.6	8.2	---	**8.4**	---	---	---	66.1	62.5	---	**64.3**
Location average	**7.5**	**9.8**	**7.6**	**8.4**	**8.7**	**7.0**	**8.3**	**65.8**	**63.7**	**65.8**	**64.8**	**62.2**	**62.9**	**64.6**

Table 72. Percent Break Flour Yield and Cookie Diameter for Soft White Winter Wheat at Kimberly, Ririe, and Aberdeen, 2017.

	Break Flour Yield (%)							Cookie Diameter (cm)						
Variety	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Soda Springs**	**Rockland**	**Average**	**Kimberly**	**Aberdeen**	**Rupert**	**Ririe**	**Soda Springs**	**Rockland**	**Average**
Bobtail	45.4	41.3	42.3	42.4	43.7	---	**43.0**	9.3	9.7	9.3	9.1	9.4	---	**9.4**
Brundage	40.3	40.2	39.6	40.8	---	---	**40.2**	9.4	9.3	9.5	9.5	---	---	**9.4**
Bruneau	40.5	39.0	40.4	37.8	36.4	---	**38.8**	9.5	9.4	9.5	9.2	9.5	---	**9.4**
IDN-01-10704A	42.2	39.3	41.5	39.5	40.1	---	**40.5**	9.2	9.5	9.3	9.2	9.6	---	**9.3**
IDN-02-29001A	43.6	39.8	41.6	---	---	---	**41.7**	9.3	9.5	9.4	---	---	---	**9.4**
IDN06-03303B	41.5	40.0	40.9	---	---	---	**40.8**	9.4	9.5	9.3	---	---	---	**9.4**
IDN09-08357A	41.0	39.5	39.8	---	---	---	**40.1**	9.6	9.3	9.5	---	---	---	**9.5**
IDN07-28017B	40.7	38.8	38.6	36.9	37.2	---	**38.5**	9.5	9.4	9.5	9.2	9.1	---	**9.3**
Jasper	44.0	41.7	42.2	42.9	42.1	45.5	**43.1**	9.4	9.3	9.3	9.5	9.5	9.2	**9.4**
LCS Artdeco	39.6	36.8	40.2	34.7	37.1	---	**37.7**	9.3	9.3	9.5	9.1	9.3	---	**9.3**
LCS Drive	39.2	35.9	38.9	---	---	---	**38.0**	9.6	9.4	9.6	---	---	---	**9.5**
LCS Shark	39.1	35.0	37.4	---	---	---	**37.2**	9.5	9.6	9.4	---	---	---	**9.5**
LCS Hulk	40.1	37.7	39.7	37.4	38.0	---	**38.6**	9.5	9.2	9.3	9.2	9.6	---	**9.4**
UI Sparrow (QC)	38.4	35.8	38.4	39.4	34.1	---	**37.2**	9.5	9.1	9.3	9.0	9.4	---	**9.3**
Norwest Duet	37.2	36.5	37.7	36.7	---	---	**37.0**	9.3	9.2	9.5	9.0	---	---	**9.3**
Norwest Tandem	38.3	34.0	34.7	35.5	36.9	---	**35.9**	9.1	9.3	9.2	9.1	9.3	---	**9.2**
OR2101043	41.3	39.2	40.3	39.8	---	---	**40.2**	9.6	9.4	9.5	9.2	---	---	**9.4**
OR2121086	38.5	36.7	38.6	37.5	---	---	**37.8**	9.5	9.4	9.4	9.0	---	---	**9.3**
ORI2150033CF+	39.4	38.4	38.0	36.0	36.8	---	**37.7**	9.5	9.3	9.4	9.3	9.3	---	**9.4**
ORI2150031CF+	39.4	37.6	37.2	37.3	38.3	---	**38.0**	9.4	9.3	9.3	9.2	9.4	---	**9.3**
Stephens	37.6	33.7	36.1	35.8	36.7	---	**36.0**	9.2	9.5	9.3	9.0	9.5	---	**9.3**
SY Ovation	38.9	37.7	36.7	36.5	37.0	---	**37.4**	9.3	9.4	9.3	9.1	9.5	---	**9.3**
SY Assure	35.3	37.7	36.6	---	---	---	**36.5**	9.5	9.2	9.6	---	---	---	**9.4**
SY Dayton	39.3	36.8	36.9	---	---	---	**37.7**	9.6	9.4	9.4	---	---	---	**9.5**
UI Castle CL+	40.7	38.5	41.4	40.5	37.8	---	**39.8**	9.4	9.3	9.3	9.4	9.4	---	**9.4**
UI Magic CL+	39.6	37.4	39.0	36.7	38.1	---	**38.2**	9.6	9.1	9.3	9.1	9.5	---	**9.3**
UI Palouse	38.6	39.1	39.9	39.6	39.9	---	**39.4**	9.8	9.5	9.5	9.5	9.4	---	**9.5**
UI Sparrow	38.4	36.2	37.4	40.3	36.1	---	**37.7**	9.2	9.3	9.0	8.9	9.5	---	**9.2**
UI-WSU Huffman	38.3	37.2	39.1	37.0	35.3	---	**37.4**	9.6	9.3	9.4	9.2	9.6	---	**9.4**
WA8232	38.3	36.9	36.4	37.7	36.3	36.4	**37.0**	9.4	9.2	9.3	9.2	9.5	8.8	**9.2**
WA8234	36.5	34.8	36.5	32.7	35.1	35.0	**35.1**	9.4	9.1	9.3	9.0	9.4	9.2	**9.2**
WB 456	36.9	33.5	35.9	---	---	---	**35.5**	9.2	9.3	9.3	---	---	---	**9.3**
XA1401	29.4	28.7	28.8	28.3	28.7	---	**28.8**	8.8	8.9	8.7	8.3	8.8	---	**8.7**
XA1101	32.5	29.6	32.8	30.2	29.3	---	**30.9**	8.9	9.2	8.9	8.7	9.0	---	**8.9**
WB-528	38.2	35.6	38.3	---	---	---	**37.3**	9.4	9.3	9.5	---	---	---	**9.4**
WB1070CL	37.0	32.0	36.6	35.1	36.4	---	**35.4**	9.2	9.1	9.4	9.0	9.4	---	**9.2**
WB1376CLP	35.8	29.7	34.7	33.2	32.9	---	**33.3**	9.2	9.3	9.2	8.8	9.2	---	**9.2**
WB1529	37.6	35.7	38.0	38.7	38.5	---	**37.7**	9.4	9.0	9.5	9.1	9.3	---	**9.2**
WB1604	39.1	36.8	39.5	---	39.1	36.5	**38.2**	9.4	9.4	9.4	---	9.3	8.9	**9.3**
WB1783	35.5	33.5	35.6	34.4	33.7	---	**34.6**	8.8	8.9	8.7	8.8	9.3	9.4	**9.0**
LWW14-73161	---	---	---	39.2	37.4	---	**38.3**	---	---	---	9.2	9.3	9.4	**9.3**
Otto	---	---	---	39.9	37.6	---	**38.7**	---	---	---	9.1	9.5	---	**9.3**
SY Banks	---	---	---	33.4	32.8	33.5	**33.3**	---	---	---	8.8	9.2	---	**9.0**
SY Command	---	---	---	37.2	38.7	38.8	**38.2**	---	---	---	9.4	9.8	---	**9.6**
Eltan	---	---	---	40.2	37.9	---	**39.0**	---	---	---	9.1	9.4	---	**9.3**
Location average	**38.8**	**36.6**	**38.1**	**37.2**	**36.8**	**37.6**	**37.6**	**9.4**	**9.3**	**9.3**	**9.1**	**9.4**	**9.2**	**9.3**

Table 73. SRC (Solvent Retention Capacity) data for Soft White Winter Wheat at Kimberly, Rupert, and Aberdeen, 2017.

	Aberdeen				Kimberly				Rupert			
Variety	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**
Bobtail	48.7	83.3	58.4	79.8	48.1	80.0	58.7	67.3	48.2	84.2	56.5	76.6
Brundage	48.5	85.0	59.4	70.7	49.0	80.1	60.3	61.5	48.6	82.2	59.2	65.2
Bruneau	48.6	84.9	59.7	79.0	47.2	79.7	57.8	67.2	48.2	80.1	58.1	73.3
IDN-01-10704A	47.5	82.2	58.2	62.0	47.9	79.5	59.0	57.3	48.1	80.5	58.9	62.5
IDN-02-29001A	47.5	85.4	58.1	61.7	46.7	80.8	57.5	59.2	47.6	81.5	58.5	59.2
IDN06-03303B	46.7	86.1	60.1	70.1	45.5	79.1	58.6	60.7	46.3	82.5	59.3	66.1
IDN09-08357A	47.7	85.4	58.3	70.8	47.7	80.1	57.7	55.9	47.6	81.5	59.0	63.0
IDN07-28017B	48.1	87.1	59.6	67.9	47.5	80.8	58.7	58.5	48.3	82.8	59.2	66.8
Jasper	47.2	89.0	58.6	84.9	46.0	76.6	59.6	61.2	45.4	83.3	59.0	74.3
LCS Artdeco	50.7	91.8	60.7	95.4	48.9	85.5	58.5	80.7	48.3	85.2	59.5	75.6
LCS Drive	50.1	90.2	62.5	97.9	49.1	84.1	60.0	84.0	48.1	84.7	60.3	85.2
LCS Shark	50.5	88.2	61.0	87.1	46.2	80.7	55.7	72.6	48.6	82.2	58.9	77.6
LCS Hulk	49.8	92.4	61.7	96.9	48.3	81.6	57.5	82.6	48.2	83.3	59.2	80.2
UI Sparrow (QC)	50.7	89.0	61.9	83.6	52.2	82.2	63.4	68.4	49.6	82.5	60.9	78.0
Norwest Duet	50.2	87.4	61.1	73.3	49.1	82.4	61.1	66.5	48.7	82.4	60.3	73.8
Norwest Tandem	52.0	90.1	64.8	85.9	49.7	84.0	60.5	65.9	50.8	85.5	61.8	69.3
OR2101043	47.7	87.8	59.5	65.3	47.4	84.2	56.4	64.9	47.4	82.8	59.0	67.6
OR2121086	48.7	87.6	60.2	59.0	47.9	82.7	56.5	57.8	48.3	81.9	57.8	57.8
ORI2150033CF+	48.5	89.2	59.9	73.5	48.6	85.7	56.9	72.0	49.8	86.1	59.6	71.3
ORI2150031CF+	48.4	88.2	58.5	70.4	48.1	85.6	57.9	65.8	50.2	86.4	61.2	73.0
Stephens	49.4	86.7	61.9	64.2	48.0	83.1	58.1	60.2	48.3	84.3	61.0	65.1
SY Ovation	49.1	85.6	60.3	71.1	49.5	83.0	59.5	61.1	50.0	82.5	58.7	65.8
SY Assure	49.9	90.0	61.5	70.1	50.0	86.6	61.3	62.2	49.6	85.7	59.8	65.1
SY Dayton	49.5	87.9	61.0	70.8	49.1	85.1	58.8	62.0	49.8	85.3	60.0	68.5
UI Castle CL+	48.8	86.2	57.9	84.6	46.6	80.0	55.1	81.3	47.5	81.8	56.7	76.3
UI Magic CL+	49.0	87.6	59.1	86.8	46.3	80.7	55.3	73.9	50.4	82.7	58.5	77.8
UI Palouse	48.0	86.2	56.4	77.5	45.8	78.4	55.1	60.7	47.3	82.1	56.8	72.1
UI Sparrow	50.4	89.0	60.9	89.5	50.4	83.4	62.1	70.3	52.2	83.8	61.8	72.5
UI-WSU Huffman	49.8	87.9	58.2	76.8	49.9	84.4	58.7	71.2	50.7	84.7	59.7	71.6
WA8232	51.0	94.7	62.8	83.4	50.1	87.0	63.0	67.7	52.1	87.1	61.7	74.4
WA8234	50.1	87.9	61.4	66.7	48.8	83.4	60.1	60.5	51.5	84.9	62.6	66.8
WB 456	50.1	86.3	60.4	64.7	50.3	83.7	60.4	61.4	51.0	84.7	60.7	71.2
XA1401	53.1	96.7	65.2	72.5	52.2	91.4	64.0	70.7	54.3	93.3	66.9	72.3
XA1101	51.6	94.0	62.5	80.4	50.8	87.9	61.4	78.8	53.0	93.3	63.6	82.9
WB-528	50.4	86.1	61.2	77.6	49.1	82.3	59.7	64.4	50.9	85.8	60.3	74.8
WB1070CL	51.8	91.8	60.9	84.1	49.6	86.2	58.9	76.0	52.6	87.0	61.1	81.8
WB1376CLP	50.2	89.2	61.9	63.3	49.2	84.3	60.0	62.4	51.6	87.9	61.9	68.4
WB1529	51.1	90.3	61.0	83.8	49.2	86.3	61.7	77.0	51.8	89.7	61.4	81.7
WB1604	49.7	90.6	59.0	69.6	49.6	85.0	60.0	61.2	50.9	88.2	59.5	66.0
WB1783	55.9	97.2	67.0	83.7	53.9	92.6	67.0	68.7	55.0	95.2	67.7	74.8
Location average	**49.7**	**88.6**	**60.6**	**76.4**	**48.7**	**83.3**	**59.3**	**67.0**	**49.7**	**84.8**	**60.2**	**71.7**

Table 74. SRC (Solvent Retention Capacity) data for Soft White Winter Wheat at Ririe, Rockland, and Soda Springs, 2017.

	Ririe				Rockland				Soda Springs			
Variety	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**
Bobtail	48.5	84.7	57.7	83.5	---	---	---	---	49.5	82.3	57.7	86.7
Brundage	50.0	83.9	58.0	73.6	---	---	---	---	---	---	---	---
Bruneau	49.7	85.8	57.8	87.0	---	---	---	---	49.9	86.6	60.2	90.2
IDN-01-10704A	49.0	82.6	56.6	64.6	---	---	---	---	47.8	83.4	58.4	72.7
IDN07-28017B	50.4	85.8	57.7	70.6	---	---	---	---	48.7	85.9	59.8	79.1
Jasper	47.2	82.7	54.6	79.5	46.0	80.3	57.2	73.8	48.4	85.7	60.3	84.5
LCS Artdeco	51.7	89.4	58.4	93.4	---	---	---	---	49.5	91.8	59.9	101.8
LCS Hulk	50.9	85.8	56.7	90.1	---	---	---	---	49.9	90.9	59.9	99.3
UI Sparrow (QC)	52.7	85.2	63.5	85.4	---	---	---	---	52.3	85.4	61.5	93.4
Norwest Duet	51.0	86.0	59.3	77.5	---	---	---	---	---	---	---	---
Norwest Tandem	52.4	88.6	59.7	82.8	---	---	---	---	51.1	88.8	60.7	89.7
OR2101043	49.7	86.0	58.7	75.4	---	---	---	---	---	---	---	---
OR2121086	49.5	86.2	57.1	63.4	---	---	---	---	---	---	---	---
ORI2150033CF+	50.9	87.5	57.3	77.9	---	---	---	---	50.8	90.5	59.3	84.2
ORI2150031CF+	51.1	87.9	57.3	76.5	---	---	---	---	49.9	91.5	59.2	84.6
Stephens	50.2	85.4	58.0	68.5	---	---	---	---	48.1	84.3	58.3	66.3
SY Ovation	51.5	84.8	59.0	68.6	---	---	---	---	47.3	82.8	57.5	72.0
UI Castle CL+	47.3	78.8	55.6	86.8	---	---	---	---	49.8	87.1	58.4	93.6
UI Magic CL+	48.9	80.2	57.3	86.1	---	---	---	---	49.3	85.5	58.8	87.5
UI Palouse	47.7	78.9	55.7	78.1	---	---	---	---	47.7	82.4	56.0	82.8
UI Sparrow	48.9	80.3	61.9	83.0	---	---	---	---	52.8	84.7	61.7	89.8
UI-WSU Huffman	50.1	82.8	59.6	81.5	---	---	---	---	50.8	87.5	59.8	85.2
WA8232	50.6	86.7	62.1	85.5	49.9	87.5	61.2	75.8	50.4	90.5	62.3	90.4
WA8234	50.0	82.9	60.6	70.8	50.1	83.2	61.3	61.1	49.8	86.8	60.1	76.9
XA1401	54.3	89.2	69.1	80.0	---	---	---	---	52.9	92.9	65.2	87.5
XA1101	52.6	88.6	64.5	89.7	---	---	---	---	50.9	94.1	61.8	104.2
WB1070CL	50.1	84.6	58.3	79.0	---	---	---	---	50.2	93.6	59.7	109.5
WB1376CLP	51.6	83.8	62.6	75.2	---	---	---	---	51.7	90.8	60.9	85.4
WB1529	49.6	86.2	60.7	88.5	---	---	---	---	50.3	96.4	61.9	101.9
WB1604	---	---	---	---	49.6	87.4	58.6	67.9	49.1	92.8	58.2	90.9
WB1783	54.1	91.4	65.7	84.6	---	---	---	---	54.3	95.7	64.9	86.5
LWW14-73161	49.3	81.6	57.6	91.1	---	---	---	---	49.5	93.7	59.6	104.7
Otto	50.4	85.8	62.1	99.4	---	---	---	---	49.8	95.9	64.7	108.4
SY Banks	50.2	84.7	61.4	74.7	51.3	86.2	62.3	68.8	50.2	91.3	62.3	74.5
SY Command	49.0	81.0	58.1	72.6	48.1	81.3	58.7	64.9	48.0	85.5	58.0	68.7
Eltan	48.7	85.1	58.9	100.0	---	---	---	---	49.6	92.8	61.9	106.5
Location average	**50.3**	**84.9**	**59.4**	**80.7**	**49.2**	**84.3**	**59.9**	**68.7**	**50.0**	**89.1**	**60.3**	**88.7**

Table 75. Hard Spring Wheat Grain Protein & Kernel Hardness, 2017.

	----------Grain Protein %----------						----------Kernel Hardness 0-100----------					
Variety	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**
Hard Red Spring												
SY Gunsight	12.0	11.9	12.7	14.1	9.3	**12.0**	89	75	90	95	79	**85.6**
SY Renegade	---	---	---	---	9.2	**9.2**	---	---	---	---	84	**84.0**
12SB0197	11.8	11.9	12.3	12.6	9.5	**11.6**	82	85	88	92	81	**85.6**
Alum	13.1	13.7	13.4	13.8	9.2	**12.6**	96	91	95	97	80	**91.8**
Cabernet	12.1	12.0	12.3	13.9	---	**12.6**	81	75	83	88	---	**81.8**
HSG 500,709	12.1	12.1	12.4	13.9	---	**12.6**	85	78	89	91	---	**85.8**
HSG 501,089	11.7	11.7	12.0	13.1	9.5	**11.6**	68	60	77	75	65	**69.0**
IDO1603S	13.0	13.1	12.6	14.5	9.8	**12.6**	90	82	86	85	77	**84.0**
Jefferson	12.2	12.1	12.7	13.9	10.0	**12.2**	95	89	90	89	78	**88.2**
LCS Iron	12.0	11.9	12.6	13.3	9.4	**11.8**	100	91	97	98	83	**93.8**
SY Basalt	12.0	11.7	11.8	13.0	---	**12.1**	86	81	93	91	---	**87.8**
SY Coho	12.2	12.8	13.2	13.9	---	**13.0**	99	91	100	100	---	**97.5**
SY Selway	---	---	---	---	10.0	**10.0**	---	---	---	---	85	**85.0**
WB9350	12.7	11.9	12.5	13.7	9.7	**12.1**	84	7	89	87	79	**69.2**
WB9411	12.7	12.7	13.0	14.3	8.8	**12.3**	93	83	96	94	76	**88.4**
WB9518	13.2	13.0	13.1	15.3	10.7	**13.1**	97	87	99	100	79	**92.4**
WB9578	12.6	12.3	12.9	14.9	10.2	**12.6**	95	87	100	100	78	**92.0**
WB9668	13.4	13.1	13.2	15.5	11.1	**13.3**	95	87	95	97	83	**91.4**
XA9301	11.4	11.2	11.4	13.1	9.4	**11.3**	88	81	87	82	78	**83.2**
XA9502	12.0	11.9	12.4	12.7	---	**12.3**	74	69	81	79	---	**75.8**
XA9503	13.2	12.2	12.7	13.4	---	**12.9**	87	76	89	84	---	**84.0**
XA9660	12.6	12.3	12.4	14.1	9.5	**12.2**	90	83	94	91	81	**87.8**
XA9760	12.8	13.9	12.9	15.2	10.1	**13.0**	98	92	96	94	75	**91.0**
12SB0224	11.7	12.0	12.2	13.8	9.4	**11.8**	88	94	97	100	80	**91.8**
Alzada (D)	15.2	15.1	15.4	17.0	---	**15.7**	---	---	---	---	---	---
Hard White Spring												
Dayn (W)	12.2	12.4	12.2	13.3	9.9	**12.0**	98	92	100	100	93	**96.6**
IDO1202S (W)	---	---	---	---	9.9	**9.9**	---	---	---	---	87	**87.0**
IDO1203-A (W)	12.1	11.7	12.5	13.5	9.0	**11.8**	---	92	100	98	83	**93.3**
IDO1602S (W)	11.5	11.9	11.9	13.4	9.3	**11.6**	76	75	79	82	75	**77.4**
Klasic (W)	12.0	11.3	12.2	13.8	8.9	**11.6**	74	59	74	70	60	**67.4**
LCS Star (W)	12.3	11.5	12.5	13.3	8.9	**11.7**	89	86	87	93	79	**86.8**
Snow Crest (W)	12.7	12.3	12.8	14.2	---	**13.0**	73	58	74	70	---	**68.8**
SY-Teton (W)	11.8	11.7	12.2	13.2	---	**12.2**	76	68	78	79	---	**75.3**
UI Platinum (W)	11.9	11.5	12.1	13.2	8.9	**11.5**	82	73	83	82	70	**78.0**
WB-Paloma (W)	12.6	12.6	12.5	13.8	8.3	**12.0**	94	86	92	89	80	**88.2**
WB7328 (W)	13.0	12.2	13.0	15.3	9.6	**12.6**	81	65	84	87	66	**76.6**
WB7589 (W)	12.9	12.6	13.0	13.7	9.4	**12.3**	87	78	91	93	76	**85.0**
WB7202 CLP (W)	12.5	12.4	12.5	13.7	9.1	**12.0**	91	84	98	89	80	**88.4**
XA7523 (W)	12.2	11.6	12.3	13.2	9.7	**11.8**	86	71	84	89	80	**82.0**
XA7524 (W)	12.1	11.5	11.7	13.2	8.7	**11.4**	84	73	83	90	77	**81.4**
Location Average	**12.4**	**12.3**	**12.6**	**13.9**	**9.5**	**12.1**	**87.2**	**77.9**	**89.4**	**89.4**	**78.3**	**84.6**

(W) = White
(D)= Durum

Table 76. Percent Flour Protein and Flour Yield for Hard Spring Wheat at Rupert, Aberdeen, Idaho Falls, Ashton, and Soda Springs, 2017.

	Flour Protein (14% mb)						Flour Yield (%)					
Variety	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average
Hard Red Spring												
SY Gunsight	12.1	12.1	12.8	14.5	9.4	**12.2**	59.3	61.2	60.6	62.3	56.0	**59.9**
SY Renegade	---	---	---	---	8.5	**8.5**	---	---	---	---	54.9	**54.9**
12SB0197	11.4	11.7	12.1	12.9	8.8	**11.4**	54.6	56.6	57.1	58.3	52.9	**55.9**
Alum	13.8	13.0	13.6	14.1	9.1	**12.7**	56.6	58.5	58.7	60.8	57.6	**58.4**
Cabernet	12.5	12.7	12.7	14.2	---	**13.0**	60.7	62.9	62.1	63.5	---	**62.3**
HSG 500,709	12.1	12.7	12.2	14.0	---	**12.8**	55.1	59.7	58.9	61.7	---	**58.9**
HSG 501,089	12.4	12.3	12.6	13.9	9.7	**12.2**	56.9	59.2	58.7	61.4	55.2	**58.3**
IDO1603S	13.3	13.9	13.3	15.9	9.9	**13.3**	57.4	59.6	59.7	60.9	54.6	**58.5**
Jefferson	11.5	12.6	12.9	14.3	9.2	**12.1**	58.0	61.6	60.6	61.5	55.9	**59.5**
LCS Iron	11.9	12.1	12.4	13.3	8.5	**11.6**	54.4	57.6	57.9	59.6	53.8	**56.7**
SY Basalt	12.1	12.2	11.4	13.6	---	**12.3**	56.6	61.0	60.5	62.6	---	**60.2**
SY Coho	12.0	13.1	12.7	14.5	---	**13.1**	55.5	58.2	58.5	60.8	---	**58.3**
SY Selway	---	---	---	---	9.0	**9.0**	---	---	---	---	58.5	**58.5**
WB9350	12.7	12.0	12.7	14.1	9.0	**12.1**	56.7	57.0	58.2	59.9	55.2	**57.4**
WB9411	12.8	12.7	12.4	15.2	8.0	**12.2**	57.6	56.4	58.1	59.0	55.6	**57.3**
WB9518	13.5	13.6	12.3	16.5	10.1	**13.2**	54.6	53.7	56.0	57.9	50.3	**54.5**
WB9578	13.2	12.7	13.6	16.4	10.1	**13.2**	58.8	59.1	60.4	62.8	56.1	**59.5**
WB9668	13.9	14.0	12.9	17.0	10.9	**13.7**	55.2	55.3	55.7	57.4	53.4	**55.4**
XA9301	10.9	11.3	11.4	13.9	8.7	**11.2**	54.9	54.7	56.7	56.8	50.6	**54.7**
XA9502	12.2	12.1	12.0	13.4	---	**12.4**	52.4	52.5	53.2	55.4	---	**53.4**
XA9503	13.4	12.4	12.5	14.1	---	**13.1**	54.6	56.1	58.0	58.6	---	**56.8**
XA9660	12.8	12.9	12.4	15.5	8.7	**12.5**	58.1	57.4	59.0	59.9	55.1	**57.9**
XA9760	14.3	12.4	12.7	16.5	9.4	**13.1**	59.9	59.9	61.3	61.2	54.6	**59.4**
12SB0224	11.8	13.0	11.2	14.4	8.8	**11.8**	55.9	55.7	57.3	57.7	54.4	**56.2**
Location Average	**12.6**	**12.6**	**12.5**	**14.6**	**9.2**	**12.2**	**56.5**	**57.9**	**58.5**	**60.0**	**54.7**	**57.6**
Hard White Spring												
Dayn (W)	12.4	11.5	11.2	14.3	8.7	**11.6**	58.7	57.7	60.3	59.7	53.5	**58.0**
IDO1203-A (W)	12.2	12.2	12.2	14.2	8.9	**11.9**	57.4	57.0	59.0	59.3	53.9	**57.3**
IDO1602S	12.0	11.9	11.5	14.6	8.2	**11.6**	57.6	57.8	59.6	60.0	57.4	**58.5**
Klasic (W)	12.4	11.3	12.1	15.3	9.0	**12.0**	59.2	58.9	60.8	59.6	56.7	**59.0**
LCS Star (W)	12.1	13.3	12.2	14.2	9.2	**12.2**	55.1	55.9	57.9	58.0	58.9	**57.2**
Snow Crest (W)	14.0	11.6	12.5	15.4	8.5	**12.4**	59.3	54.3	57.7	56.6	56.6	**56.9**
SY-Teton (W)	11.7	11.6	12.2	14.3	---	**12.5**	57.4	54.7	58.8	57.9	---	**57.2**
UI Platinum (W)	11.8	12.5	12.3	13.8	8.5	**11.8**	58.9	58.3	60.7	61.7	58.9	**59.7**
WB-Paloma (W)	13.0	13.0	12.9	14.0	7.5	**12.1**	57.5	54.2	58.4	60.1	57.3	**57.5**
WB7328 (W)	13.2	12.7	13.7	16.7	10.1	**13.3**	52.4	53.1	57.1	56.3	56.1	**55.0**
WB7589 (W)	13.3	13.2	13.4	15.3	9.4	**12.9**	53.7	54.9	55.8	58.3	53.3	**55.2**
WB7202CLP (W)	12.5	13.0	12.8	13.2	8.4	**12.0**	51.2	50.9	53.6	55.5	51.2	**52.5**
XA7523 (W)	12.5	12.3	13.0	14.0	9.7	**12.3**	56.8	57.6	58.6	59.8	56.7	**57.9**
XA7524 (W)	12.1	11.7	11.9	13.7	8.2	**11.5**	54.2	48.9	51.9	53.5	51.5	**52.0**
Location Average	**12.5**	**12.3**	**12.4**	**14.5**	**8.8**	**12.2**	**56.4**	**55.3**	**57.9**	**58.3**	**55.5**	**56.7**

(W) = White

mb = moisture basis

Table 77. Bake Volume for Hard Spring Wheat, 2017.

	Bake Volume (cc)				
Variety	**Aberdeen**	**Ashton**	**Idaho Falls**	**Rupert**	**Average**
Hard Red Spring Wheat					
SY Gunsight	1075	1125	1100	1075	**1094**
SY Renegade	1025	1150	1050	1075	**1075**
Alum	1175	1300	1200	1225	**1225**
Cabernet	1400	1400	1400	1150	**1338**
HSG 500,709	1200	1400	1175	1125	**1225**
HSG 501,089	1150	1400	1125	1100	**1194**
IDO1603S	1400	1400	1300	1125	**1306**
Jefferson	1225	1225	1200	1025	**1169**
LCS Iron	1075	1175	1125	1075	**1113**
SY Basalt	1225	1200	1150	1125	**1175**
SY Coho	1200	1225	1200	1225	**1213**
WB9350	1075	1400	1250	1150	**1219**
WB9411	1225	1400	1225	1125	**1244**
WB9518	1225	1400	1050	1125	**1200**
WB9578	1000	1400	1225	1175	**1200**
WB9668	1400	1275	1400	1200	**1319**
XA9301	1050	1225	1075	1050	**1100**
XA9502	1150	1400	1300	1200	**1263**
XA9503	1175	1400	1400	1400	**1344**
XA9660	1175	1400	1125	1200	**1225**
XA9760	1200	1250	1150	1400	**1250**
12SB0224	1125	1225	1025	1075	**1113**
Location Average	**1180**	**1308**	**1193**	**1156**	**1209**
Hard White Spring Wheat					
Dayn (W)	1125	1175	1125	1125	**1138**
IDO1203-A (W)	1150	1250	1125	1125	**1163**
IDO1602S (W)	1125	1250	1125	1050	**1138**
Klasic (W)	1025	1400	1200	1150	**1194**
LCS Star (W)	1050	1275	1075	1100	**1125**
Snow Crest (W)	1400	1400	1200	1175	**1294**
SY-Teton (W)	1125	1300	1000	1100	**1131**
UI Platinum (W)	1150	1400	1075	1050	**1169**
WB-Paloma (W)	1225	1400	1175	1125	**1231**
WB7328 (W)	1175	1400	1225	1200	**1250**
WB7589 (W)	1400	1175	1275	1200	**1263**
WB7202CLP (W)	1150	1150	1100	1200	**1150**
XA7523 (W)	1200	1400	1200	1175	**1244**
XA7524 (W)	1150	1175	1125	1150	**1150**
Location Average	**1175**	**1296**	**1145**	**1138**	**1188**

(W) = White

Table 78. Soft White Spring Wheat Grain Protein & Kernel Hardness, 2017.

	--------Grain Protein %--------						--------Kernel Hardness 0-100--------					
Variety	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**
14-SSW-1059	11.4	12.2	10.2	13.5	10.4	**11.5**	30	33	41	36	25	**33.0**
Alturas	10.9	11.4	9.5	12.4	9.8	**10.8**	24	28	36	31	23	**28.4**
IDO1403S	11.4	11.5	10.0	13.5	10.7	**11.4**	28	30	39	32	31	**32.0**
IDO1405S	10.9	12.2	10.3	13.4	10.3	**11.4**	21	27	33	3	23	**21.4**
Louise	11.1	11.9	10.7	12.8	9.6	**11.2**	29	31	38	32	29	**31.8**
Melba*	10.9	10.9	9.9	11.4	---	**10.8**	31	33	43	37	---	**36.0**
Seahawk	10.9	11.6	10.2	12.8	---	**11.4**	31	35	43	35	---	**36.0**
SY Saltese	10.7	11.8	10.4	13.0	9.4	**11.1**	29	31	34	31	30	**31.0**
Tekoa	10.7	11.6	9.9	12.9	---	**11.3**	29	32	36	32	---	**32.3**
UI Pettit	10.9	11.1	9.8	12.9	10.5	**11.0**	29	29	39	38.0	33.0	**33.6**
UI Stone	10.9	11.5	9.1	12.3	9.5	**10.7**	20	26	32	31	19	**25.6**
WA 8277	11.4	12.4	11.0	13.1	---	**12.0**	34	38	43	39	---	**38.5**
WA 8278	10.0	11.3	9.5	12.2	---	**10.8**	37	39	46	39	---	**40.3**
WB6121	12.7	13.0	10.8	13.8	10.2	**12.1**	26	28	37	34	29	**30.8**
WB6341	10.6	11.0	9.4	12.0	---	**10.8**	24	27	35	32	---	**29.5**
WB6430	11.1	11.7	9.2	12.0	9.4	**10.7**	23	29	35	35	25	**29.4**
Location Average	**11.0**	**11.7**	**10.0**	**12.8**	**10.0**	**11.2**	**27.8**	**31.0**	**38.1**	**32.3**	**26.7**	**31.8**

*= indicates club wheat

Table 79. Percent Flour Protein and Flour Yield for Soft White Spring Wheat at Rupert, Aberdeen, Idaho Falls, Ashton, and Soda Springs, 2017.

	Flour Protein (14% mb)						Flour Yield (%)					
Variety	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average
14-SSW-1059	8.8	9.7	9.8	11.3	7.9	**9.5**	66.6	67.5	66.7	63.2	63.2	**65.4**
Alturas	8.7	9.2	9.0	10.4	7.5	**9.0**	69.2	70.2	68.7	66.4	67.6	**68.4**
IDO1403S	9.1	9.2	9.8	11.2	8.2	**9.5**	67.0	67.9	67.0	63.6	64.1	**65.9**
IDO1405S	8.3	9.8	9.2	11.3	7.8	**9.3**	67.0	67.6	65.8	64.3	64.5	**65.8**
Louise	8.6	9.5	9.8	10.4	7.1	**9.1**	69.5	69.3	67.5	66.7	66.2	**67.8**
Melba*	8.4	8.5	9.1	9.5	---	**8.9**	69.9	71.2	69.7	68.5	---	**69.8**
Seahawk	8.6	9.1	9.1	10.5	---	**9.3**	68.9	68.6	67.4	66.9	---	**67.9**
SY Saltese	8.3	9.4	9.4	10.7	6.9	**8.9**	68.4	67.7	66.2	65.1	66.1	**66.7**
Tekoa	8.2	9.4	9.0	10.7	---	**9.3**	70.6	69.4	68.1	68.0	---	**69.0**
UI Pettit	8.6	9.0	9.0	10.5	7.8	**9.0**	69.1	68.9	68.0	67.4	66.2	**67.9**
UI Stone	8.6	9.5	9.0	10.1	7.4	**8.9**	69.8	69.3	68.4	67.9	68.2	**68.7**
WA 8277	9.0	10.5	10.1	11.1	---	**10.2**	70.2	70.7	68.4	69.4	---	**69.7**
WA 8278	7.4	8.8	8.3	9.7	---	**8.6**	68.7	68.3	66.7	65.8	---	**67.4**
WB6121	9.9	10.9	10.3	11.4	7.8	**10.1**	66.5	64.7	65.0	63.6	66.4	**65.2**
WB6341	8.4	8.8	8.9	9.7	---	**9.0**	68.8	67.9	67.6	70.5	---	**68.7**
WB6430	8.5	9.3	8.3	9.4	7.1	**8.5**	68.7	66.3	67.3	69.4	67.2	**67.8**
Location Average	**8.6**	**9.4**	**9.3**	**10.5**	**7.6**	**9.2**	**68.7**	**68.5**	**67.4**	**66.7**	**66.0**	**67.6**

mb = moisture basis

*= indicates club wheat

Table 80. Percent Break Flour and Cookie Diameter for Soft White Spring Wheat at Rupert, Aberdeen, Idaho Falls, Ashton, and Soda Springs, 2017.

	Break Flour (%)						Cookie Diameter (cm)					
Variety	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average	Rupert	Aberdeen	Idaho Falls	Ashton	Soda Springs	Average
14-SSW-1059	37.2	38.0	35.9	34.1	37.8	**36.6**	9.2	9.1	9.0	9.0	9.3	**9.1**
Alturas	40.0	40.4	37.4	35.7	40.0	**38.7**	9.2	9.4	9.5	8.8	9.2	**9.2**
IDO1403S	39.2	40.7	38.2	35.5	37.9	**38.3**	9.1	9.6	9.3	9.0	9.2	**9.3**
IDO1405S	41.6	40.3	38.5	36.1	39.5	**39.2**	9.3	9.5	9.1	9.3	9.0	**9.2**
Louise	39.5	39.6	39.0	36.9	38.6	**38.7**	9.3	9.5	9.3	9.2	9.3	**9.3**
Melba*	41.3	41.1	40.0	36.7	---	**39.8**	9.4	9.4	9.3	8.9	---	**9.3**
Seahawk	40.1	39.4	38.2	36.7	---	**38.6**	9.0	9.4	9.4	9.1	---	**9.2**
SY Saltese	40.3	40.6	39.8	38.4	39.5	**39.7**	9.3	9.4	9.2	9.1	9.1	**9.2**
Tekoa	41.3	41.1	41.1	40.2	---	**40.9**	9.3	9.4	9.0	9.0	---	**9.2**
UI Pettit	40.7	41.8	39.2	36.4	37.0	**39.0**	9.0	9.6	9.1	9.2	9.0	**9.2**
UI Stone	43.3	42.3	41.6	37.5	43.4	**41.6**	9.5	9.5	9.3	9.1	9.3	**9.4**
WA 8277	38.8	38.8	38.8	38.7	---	**38.8**	9.5	9.5	9.4	9.2	---	**9.4**
WA 8278	41.4	40.6	38.9	37.4	---	**39.6**	9.3	9.0	9.0	9.0	---	**9.1**
WB6121	38.8	38.9	36.5	34.7	37.8	**37.3**	9.3	9.2	9.3	9.1	9.1	**9.2**
WB6341	42.8	42.4	39.9	39.7	---	**41.2**	9.1	9.6	9.4	9.1	---	**9.3**
WB6430	41.9	42.2	40.2	39.1	40.3	**40.7**	9.5	9.2	9.2	9.3	9.5	**9.3**
Location Average	**40.5**	**40.5**	**38.9**	**37.1**	**39.2**	**39.3**	**9.3**	**9.4**	**9.2**	**9.1**	**9.2**	**9.2**

*= indicates club wheat

Table 81. SRC (Solvent Retention Capacity) data for Soft White Spring Wheat at Rupert, Aberdeen, Idaho Falls, 2017.

	Rupert				Aberdeen				Idaho Falls			
Variety	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**
14-SSW-1059	32.8	64.4	43.5	55.4	49.8	86.6	60.0	82.3	51.4	90.3	63.0	80.1
Alturas	49.1	83.0	60.2	87.3	49.8	84.1	58.3	99.9	49.0	86.4	59.3	86.1
IDO1403S	49.0	82.7	60.4	83.8	47.5	84.3	59.6	90.9	48.8	86.6	59.9	81.6
IDO1405S	47.7	82.4	60.9	81.1	46.4	82.4	57.5	86.1	47.5	86.9	58.4	88.3
Louise	50.4	80.2	59.5	80.4	47.3	81.3	57.9	87.8	48.4	87.0	58.8	96.9
Melba*	48.3	75.8	59.9	63.7	47.4	77.0	58.2	63.9	48.8	80.5	59.8	67.7
Seahawk	48.9	80.7	61.2	64.7	48.6	81.7	60.3	70.7	49.0	86.4	60.6	70.8
SY Saltese	48.3	81.0	60.3	76.1	47.5	82.5	59.9	89.6	48.2	87.0	58.3	90.1
Tekoa	46.1	77.9	57.8	71.8	45.6	79.7	55.9	83.7	46.0	85.0	56.4	85.5
UI Pettit	46.7	77.5	58.6	68.7	48.0	79.6	58.5	78.2	48.3	83.4	57.5	77.0
UI Stone	46.7	79.3	57.1	84.2	46.9	79.4	57.6	93.3	47.1	84.3	56.3	88.0
WA 8277	47.2	76.9	58.2	66.1	47.2	76.3	57.2	71.5	46.7	82.9	57.8	73.6
WA 8278	49.1	79.3	62.1	73.3	48.5	79.5	59.9	85.9	48.9	82.2	59.9	84.9
WB6121	47.6	88.1	58.1	81.9	46.9	86.7	57.1	84.7	47.7	88.3	58.2	76.6
WB6341	46.7	82.4	56.9	87.9	45.6	79.2	55.1	92.7	47.1	84.7	57.1	89.4
WB6430	46.7	80.8	59.2	58.7	46.1	77.8	57.8	66.5	46.9	81.7	57.0	57.3
Location average	**47.0**	**79.5**	**58.4**	**74.1**	**47.4**	**81.1**	**58.2**	**83.0**	**48.1**	**85.2**	**58.7**	**80.9**

*= Club Wheat

Table 82. SRC (Solvent Retention Capacity) data for Soft White Spring Wheat at Ashton and Soda Springs, 2017.

	Ashton				Soda Springs			
Variety	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**	**Water**	**Sucrose**	**Na2CO3**	**LacticAcid**
14-SSW-1059	51.4	90.1	62.3	89.6	51.7	88.4	65.2	78.0
Alturas	49.7	87.9	61.4	108.6	49.2	83.6	61.6	92.0
IDO1403S	49.5	90.0	59.4	102.8	50.4	82.4	63.4	93.3
IDO1405S	48.9	89.8	61.7	113.2	49.1	84.3	64.5	97.4
Louise	49.2	86.9	60.4	105.2	50.1	80.3	65.5	86.8
Melba*	50.6	79.2	59.7	69.0	---	---	---	---
Seahawk	49.6	87.8	61.3	83.6	---	---	---	---
SY Saltese	49.1	90.0	58.9	109.6	49.5	79.9	63.6	83.7
Tekoa	48.4	88.9	59.1	106.0	---	---	---	---
UI Pettit	50.6	88.2	59.8	82.1	49.7	80.4	61.2	75.7
UI Stone	49.4	89.2	59.8	105.0	47.0	80.1	63.5	90.6
WA 8277	48.6	84.4	59.8	80.8	---	---	---	---
WA 8278	49.6	87.4	60.6	105.4	---	---	---	---
WB6121	49.9	91.0	58.9	89.9	49.7	85.4	61.5	84.9
WB6341	49.1	87.6	60.4	106.6	---	---	---	---
WB6430	50.0	84.6	60.9	63.6	50.3	80.1	63.7	61.5
Location average	**49.6**	**87.7**	**60.3**	**95.1**	**49.7**	**82.5**	**63.4**	**84.4**

*= Club Wheat

Addendum 1. Resistance reaction of soft white winter wheat varieties in a heavily inoculated dwarf *bunt (Tilletia controversa)* nursery, Logan, UT. 2018. Cooperator Dr. David Hole.

Winter Wheat Variety	Percent bunted heads (%)	Overall disease rating
UI Sparrow	0	VR
Otto	3.5	MR
SY Assure	4	MR
Otto	5	MR
Rosalyn	6	MS
WA8271	9	MS
Norwest Duet	10	MS
SY Banks	10	MS
IDN07-28017B	11	MS
UI Magic	15	MS
ORI2150031Cl+	17.5	S
UIL14-75044	18.5	S
LWW14-74143	20	S
OR2121086	20	S
UI Castle	20	S
WB1529	25	S
IDO1005	26	S
WB1604	30	S
Brundage	32.5	S
IDO1708	32.5	S
LCS Hulk	37.5	S
OR2101043	37.5	S
OR2121285	40	S
Stephens	40	S

Winter Wheat Variety	Percent bunted heads (%)	Overall disease rating
WB 456	40	S
IDN09-15702A	45	S
Bruneau	47.5	S
LWW14-73161	47.5	S
WA8232	47.5	S
LCS Artdeco	52.5	S
WB1376CLP	55	S
SY Ovation	57.5	S
SY Command	60	S
UIL15-72223	60	S
LCS Shark	62.5	S
Norwest Tandem	65	S
ORI2150061Cl+	70	S
IDN10-08606A	72.5	S
WB1783	72.5	S
Jasper	75	S
SY Dayton	75	S
LCS Drive	77.5	S
LWW14-72916	77.5	S
Bobtail	79.5	S

(W) = white
(SWW) = soft white winter

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

Addendum 2. Resistance reaction of hard red and white winter wheat varieties in a heavily inoculated *dwarf bunt (Tilletia controversa)* nursery, Logan, UT. 2018. Cooperator Dr. David Hole.

Winter Wheat Variety	Percent bunted heads (%)	Overall disease rating
Curlew	0	VR
Deloris	0	VR
Golden Spike (W)	0	VR
IDO1607	0	VR
Juniper	0	VR
Promontory	0	VR
UI SRG	0	VR
UICF Grace (W)	0	VR
Utah 100	0	VR
UI Silver (W)	0.25	VR
IDO1101 (W)	1	R
MTF1435	2	R
Greenville	2.5	MR
IDO1506 (W)	2.5	MR
Yellowstone	3.5	MR
SY Clearstone 2CL	5	MR
Eltan (SWW)	6	MS
Sequoia	9	MS
Lucin-CL	27.5	S
IDO1706 (W)	35	S
LCS Rocket	55	S
Bearpaw	62.5	S
SY Touchstone (W)	62.5	S
Irv (W)	65	S
Keldin	65	S
Norwest 553	65	S
WB4623CLP	65	S

Winter Wheat Variety	Percent bunted heads (%)	Overall disease rating
Metropolis	67.5	S
Northern	67.5	S
LCS Jet	70	S
Rebelde	70	S
WB4269	72.5	S
Loma	75	S
MTF1432	77.5	S
IRV (W)	77.5	S
Mandala	80	S
OR2120358H	80	S
Whetstone	80	S
LWW14-73915	82.5	S
OR2130021R	82.5	S
ACC Wildfire	85	S
LCS Yeti (W)	85	S
Warhorse	87.5	S
WA8252 (W)	90	S
WA8294	90	S
WA8268	92.5	HS
OR2130118H (W)	97	HS

0	VR = very resistant
1 - 2	R = resistant
3 - 5	MR = moderately resistant
6 - 15	MS = moderately susceptible
> 15	S = suseptible
>90	HS = Holy Smokes!

Addendum 3a. Stripe rust (*Puccinia striiformis* f.sp. *tritici*) ratings for 2016 winter wheat. Stripe rust was not severe in 2017 or 2018 in the southeastern portions of Idaho.

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
Judee	6.0	8	0.50	MR
Keldin	7.0	26	1.84	S
LCI 13DH04-16 (W)	7.5	10	0.75	MS
LCI 13DH14-53 (W)	7.0	43	2.98	VS
LCS Yeti (W)	8.0	8	0.62	MR
LCI13DH14-83 (W)	7.0	40	2.80	VS
LCS Colonia	6.3	2	0.13	R
LCS Jet	7.0	3	0.21	MR
Loma	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
Irv (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 (W)	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
Whetstone	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 fungiicde application when stripe rust is present

VS = will need fungicdes in the presence of stripe rust, at times up to three applicatons 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
BZ6W09-489	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 Artdeco	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
LCS Hulk	3.5	1	0.03	R
Madsen	7.0	18	1.24	S
Norwest Duet	4.3	1	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		

Addendum 3b. Stripe rust (*Puccinia striiformis* f.sp. *tritici*) ratings for 2016 winter wheat. Stripe rust was not severe in 2017 or 2018 in the southeastern portions of Idaho.

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

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
Judee	4.5	9	0.38	MR
Juniper	6.5	7	0.42	MS
Keldin	8.0	18	1.40	S
LCI 13DH04-16 (W)	5.5	6	0.30	MR
LCI 13DH14-53 (W)	8.0	15	1.20	S
LCS Yeti (W)	8.0	15	1.20	S
LCI13DH14-83 (W)	6.5	10	0.65	MS
LCS Colonia	2.5	1	0.01	R
LCS Jet	5.0	7	0.33	MR
Loma	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
Irv (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 (W)	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 (*Puccinia striiformis* f.sp. *tritici*) ratings for 2016 spring 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.

Hard Spring Wheat	Stripe Rust Infection type	Percent leaf area infected	IT x PLAI %	Relative RATING
WB9518	1.5	0.3	0.0038	R
SY Gunsight	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 Infection type	Percent leaf area infected	IT x PLAI %	Relative RATING
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-1035CL+	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 fungiicde application when stripe rust is present

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

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

Addendum 5a. Results from the 2017 FHB Spring Wheat 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.
Lines with the same letter behind the rating are not signfcantly different.

Table 1. Screening (29) hard red spring wheat varieties for FHB

Variety	Resistance rating	FHB Index* (%)	FDK (%)	Yield (bu/A)	Test weight (lb/bu)	DON (ppm)
Rollag	R	2.0 J	0.7 IJ	78.9 A-G	62.0 A	1.1
HRS3419	R	3.8 IJ	0.3 J	87.1 A-D	58.5 A-D	0.6
SY Selway	MS[x]	13.6 HIJ	5.8 D-I	70.9 A-H	54.0 C-E	21.2
SY Gunsight	MR	14.9 HIJ	3.6 E-J	79.4 A-G	59.0 ABC	8.8
WB9668	MS	15.6 HIJ	7.4 B-F	59.8 E-I	56.5 B-E	24.5
LCS Iron	MS	19.9 G-J	3.0 G-J	93.2 A	59.5 ABC	9.8
12SB0197	MS	21.5 GHI	3.2 F-J	90.1 ABC	57.5 A-E	7.9
WB9350	MS	21.5 GHI	7.0 C-G	65.1 C-I	54.5 C-E	31.2
WB9578	MS	22.9 GH	4.0 E-J	67.6 B-H	59.0 ABC	11.2
XA9660	S	26.3 FGH	7.4 B-F	64.2 D-I	56.5 B-E	19.5
WB9433	S	26.4 FGH	11.2 ABC	55.9 GHI	53.5 EF	29.2
SY Renegade	S	26.6 FGH	2.6 HIJ	92.7 AB	59.5 ABC	9.1
IDO1603S	S	28.4 E-H	8.5 BCD	67.3 C-H	55.5 C-E	17.1
12SB0224	S	29.2 D-H	6.0 D-H	79.6 A-G	57.5 A-E	16.9
WB9411	S	29.2 D-H	4.0 E-J	67.3 C-H	59.5 ABC	9.1
IDO1602S	S	29.7 D-H	3.8 E-J	81.6 A-F	59.5 ABC	13.4
HSG 500,709	S	31.3 C-H	10.7 A-D	65.8 C-I	53.5 EF	37.3
Alum	S	35.9 C-G	3.2 F-J	79.4 A-G	61.0 AB	7.2
SY Coho	VS	42.1 B-F	8.5 BCD	74.3 A-H	55.0 C-E	21.3
SY Basalt	VS	42.3 B-F	6.4 D-H	82.3 A-E	57.5 A-E	11.1
WB936	VS	43.5 B-F	13.2 A	41.6 I	46.5 G	55.3
XA9760	VS	44.0 B-F	7.9 B-E	69.5 A-H	57.0 B-E	21.5
HSG 501,089	VS	45.7 B-E	11.4 AB	49.4 HI	51.5 F	30.3
Jefferson	VS	46.9 A-D	6.5 D-H	63.2 D-I	57.5 A-E	19.4
Cabernet	VS	47.9 ABC	8.5 BCD	56.9 F-I	55.0 C-E	30.2
Kelse	VS	47.9 ABC	5.8 D-H	71.6 A-H	58.5 A-D	8.9
WB9518	VS	48.0 ABC	10.7 A-D	50.6 HI	54.0 DEF	33.2
XA9301	VS	58.1 AB	9.4 A-D	65.4 C-I	54.5 C-E	29.5
XA9502	VS	64.5 A	10.7 A-D	55.9 GHI	51.0 FG	40.6
P (α=0.05)		<.0001	<.0001	0.0156	0.0003	

[x]High DON accumulation

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

0	VR = very resistant
1 - 3	R = resistant
4 - 17	MR = moderately resistant
18 - 25	MS = moderately susceptible
26 - 40	S = suseptible
41 - 100	VS = very susceptible

Data analyzed using PROC GLYMMIX in SAS

This material is based upon work supported by the U.S. Department of Agriculture, under Agreement No. 59-0206-4-042. This is a cooperative project with the U.S. Wheat & Barley Scab Initiative. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.

Addendum 5b. Results from the 2017 FHB Spring Wheat 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.
Lines with the same letter behind the rating are not signfcantly different.

Table 2. Screening (14) hard white spring wheat varieties and (2) durum for FHB

Variety	Resistance rating	FHB Index (%)	FDK (%)	Yield (bu/A)	Test weight (lb/bu)	DON (ppm)
Rollag	R	2.0 J	0.7 IJ	78.9 A-G	62.0 A	1.1
XA7523	MR	9.6 B	1.8 H	70.5 BC	58.5 AB	5.6
Dayn	MR	11.9 B	2.0 GH	106.0 A	60.0 A	6.0
LCS Star	MS	19.2 B	4.4 E-H	76.5 AB	56.5 ABC	13.9
Snow Crest	S[X]	8.5 B	4.6 D-H	76.2 AB	56.5 ABC	17.0
WB7328	S[X]	11.1 B	7.2 A-F	52.8 BCD	54.0 BCD	31.3
SY-Teton	S[X]	14.2 B	5.2 C-H	70.0 BC	55.5 A-D	16.8
WB7202CLP	S[X]	18.2 B	11.0 A	55.5 BCD	52.5 CD	30.2
XA7524	S[X]	19.6 B	8.5 A-E	55.9 BCD	54.5 BCD	34.1
IDO1203	S	40.2 A	6.2 B-G	78.0 AB	57.0 ABC	16.2
IDO1202S	S	40.4 A	3.4 FGH	82.3 AB	60.0 A	10.5
WB-Paloma	VS	40.8 A	8.9 A-D	58.3 BCD	54.0 BCD	40.2
Imperial (D)	VS	48.9 A	9.8 AB	35.4 D	47.0 E	37.3
Alzada (D)	VS	49.1 A	7.9 A-E	60.0 BCD	55.5 A-D	23.8
UI Platinum	VS	49.2 A	5.4 C-H	53.7 BCD	55.0 BCD	22.9
Klasic	VS	50.1 A	10.2 A	44.3 CD	51.0 DE	28.3
WB7589	VS	55.8 A	9.2 ABC	67.6 BC	55.5 A-D	25.1
P (α=0.05)		<.0001	0.0045	0.0262	0.0033	

Table 3. Screening (16) soft white spring wheat varieties for FHB

Variety	Resistance rating	FHB Index (%)	FDK (%)	Yield (bu/A)	Test weight (lb/bu)	DON (ppm)
Rollag	R	2.0 J	0.7 IJ	78.9 A-G	62.0 A	1.1
WB6121	MR	6.6 E	1.0 C	74.1 EF	59.5 C-F	9.6
WA 8277	MR	12.9 DE	0.8 C	91.5 A-F	62.0 A	6.0
Tekoa	MR	13.3 DE	1.0 C	117.2 A	61.0 ABC	5.5
14-SSW-1059	MR	17.9 CDE	1.6 BC	112.3 ABC	58.5 E-G	4.9
Alturas	MS	18.6 CDE	1.0 C	100.0 A-E	60.5 A-D	4.4
UI Pettit	MS	20.4 B-E	1.4 BC	88.8 B-F	57.5 GH	13.9
IDO1403S	MS	21.6 B-E	1.4 BC	89.8 A-F	59.5 C-F	7.3
WB6430	MS	21.8 B-E	2.6 B	80.9 DEF	57.0 H	21.7
Melba	MS	24.3 B-E	0.7 C	92.9 A-F	60.0 B-E	3.7
UI Stone	MS[Y]	39.5 AB	0.7 C	116.4 AB	60.5 A-D	3.7
WB6341	S	26.9 BCD	1.4 BC	96.6 A-E	58.0 FGH	10.7
IDO1405S	S	28.1 BCD	1.2 BC	88.1 C-F	59.0 D-G	9.3
SY Saltese	S	32.0 A-D	2.0 BC	91.3 A-F	59.0 D-G	9.2
Seahawk	S	32.3 A-D	1.3 BC	107.5 A-D	61.5 AB	5.4
WA 8278	S	34.8 ABC	1.4 BC	100.0 A-E	60.0 B-E	5.3
Louise	VS	52.1 A	5.8 A	66.1 F	57.5 GH	13.7
P (α=0.05)		0.0256	0.0006	0.0455	0.0002	

MS[Y] low DON

Addendum 6a. Results from the 2017 FHB Spring Barley 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.

Lines with the same letter behind the rating are not signfcantly different.
Screening two-rowed malt barley varieties for FHB

Variety	Rating	FHB Index (%)	Yield (bu/A)	Test weight (lb/bu)	DON (ppm)
Clho 4196	R	0.3 H	69.0 KLM	48.7 BCD	1.2
Merem	R	0.7 GH	121.0 A-D	48.7 BCD	2.5
ICB 111809	R	0.9 GH	64.5 LM	48.1 B-E	3.7
Harrington	MR	1.1 GH	89.0 G-L	47.6 C-F	3.3
ABI Balster	MR	1.2 GH	123.7 AB	48.2 B-E	6.0
ABI Growler	MR	1.5 GH	109.5 A-G	47.1 D-G	4.5
Conlon	MR	1.5 GH	92.3 E-K	47.4 C-G	3.7
ACC Synergy	MR	1.6 GH	131.6 A	49.8 AB	7.4
Hockett	MR	1.8 GH	113.8 A-G	48.7 BCD	7.7
CDC Meredith	MR	1.9 GH	105.3 B-H	48.0 B-E	4.9
ABI Voyager	MR	2.3 FGH	103.5 B-I	48.5 BCD	6.3
AC Metcalfe	MR	2.3 FGH	106.2 A-G	48.7 BCD	5.5
Far15-52A	MR	2.3 FGH	55.4 M	46.7 D-H	7.7
Conrad	MR	2.4 FGH	122.3 ABC	49.2 BC	11.8
CDC Copeland	MS	2.7 FGH	115.0 A-G	47.9 B-E	6.1
ND Genesis	MS	3.2 E-H	109.5 A-G	47.4 C-G	5.9
2B11-5166	MS	3.3 E-H	117.7 A-E	46.2 E-I	5.8
ABI Eagle	MS	3.4 E-H	119.8 A-D	47.2 C-G	4.9
Golden Promise	MS	3.9 E-H	101.0 B-I	44.1 JK	11.2
Pinnacle	MS	3.9 E-H	115.3 A-F	49.2 BC	9.6
2Ab08-X05M010-82	MS	4.0 E-H	113.8 A-G	46.8 D-G	7.3
GemCraft	MS	4.5 D-H	122.8 AB	46.7 D-H	13.1
Moravian 169	S	5.0 D-H	89.9 F-L	45.7 F-J	10.9
Moravian 69	S	5.6 D-H	79.3 H-M	44.7 H-K	9.0
Explorer	S	6.0 D-H	98.6 B-I	45.5 G-I	15.9
2Ab07-X031098-31	S	8.3 D-G	70.8 J-M	51.3 A	6.0
LCS Sienna	S	9.7 C-F	96.5 C-J	45.4 G-K	12.2
SY Sirish	S	10.6 B-E	99.9 B-I	44.1 JK	23.6
Bill Coors 100	S	12.1 BCD	78.1 I-M	44.2 IJK	15.2
LCS Odyssey	VS	17.2 ABC	101.4 B-I	41.9 LM	26.6
LCS Opera	VS	18.0 AB	95.9 D-J	40.8 M	20.0
LCS Genie	VS	21.0 A	104.1 B-I	43.4 KL	21.5
P (α=0.05)		0.0001	<.0001	<.0001	

	0	R = resistant
*Resistant check	1 - 2	MR = moderately resistant
*Susceptible check	3 - 5	MS = moderately susceptible
	6 - 15	S = suseptible
	15 - 40	VS = very susceptible

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

Data analyzed using PROC GLYMMIX in SAS

This material is based upon work supported by the U.S. Department of Agriculture, under Agreement No. 59-0206-4-042. This is a cooperative project with the U.S. Wheat & Barley Scab Initiative. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.

Addendum 6b. Results from the 2017 FHB Spring Barley 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.

Lines with the same letter behind the rating are not signfcantly different.

Screening two-rowed feed barley varieties for FHB

Variety	Rating	FHB Index (%)	Yield (bu/A)	Test weight (lb/bu)	DON (ppm)
Clho 4196	R	0.3 G	69.0 GH	48.7 B-F	1.2
ICB 111809	R	0.9 G	64.5 H	48.1 C-F	3.7
Xena	R	0.9 G	124.4 AB	47.9 C-F	4.9
Clearwater	MR	1.4 FG	84.1 E-H	53.2 A	7.1
Champion	MR	1.7 FG	134.6 A	48.9 B-F	6.7
Lenetah	MR	1.8 EFG	123.1 AB	49.6 BCD	4.9
Sawtooth	MR	1.8 EFG	76.0 FGH	49.4 B-E	6.2
Altorado	MR	2.2 D-G	115.6 ABC	48.8 B-F	16.4
Transit	MS	2.8 C-G	80.2 FGH	50.9 AB	3.2
Idagold II	MS	3.0 B-G	119.2 ABC	47.1 DEF	10.7
Vespa	MS	3.9 A-G	98.6 C-F	46.6 EF	7.4
CDC Fibar	MS	4.1 A-G	79.9 FGH	50.5 ABC	9.7
Claymore	MS	4.2 A-G	112.0 A-D	48.0 C-F	9.3
Kardia	S	5.2 A-F	85.9 E-H	49.4 B-E	4.8
RWA 1758	S	5.8 A-E	106.2 B-E	47.3 DEF	7.6
Harriman	S	6.0 A-D	123.7 AB	48.3 B-F	7.8
2Ab09-X06F058HL-31	S	6.7 ABC	83.5 E-H	52.6 A	6.9
Oreana	S	6.9 AB	91.1 D-G	46.3 F	17.5
Julie	S	7.6 A	80.2 FGH	51.1 AB	3.3
P (α=0.05)		0.0152	<.0001	0.0025	

Screening six-rowed barley varieties for FHB

Variety	Rating	FHB Index (%)	Yield (bu/A)	Test weight (lb/bu)	DON (ppm)
Chevron	R	0.3 C	69.3 FG	46.3 AB	0.9
Quest	R	0.6 C	92.9 EF	46.1 ABC	7.0
Lacey	MR	1.1 C	113.2 A-E	47.0 A	8.9
Stander	MR	1.5 C	120.7 ABC	48.1 A	10.3
Celebration	MR	1.9 C	94.1 C-E	48.8 A	7.0
01Ab9663	MS	2.9 C	123.4 AB	46.4 A	18.3
Tradition	MS	3.4 BC	127.4 A	46.4 A	11.3
UTSB10905-72	MS	5.3 BC	119.8 A-D	40.5 D	16.8
UTSB10902-91	S	6.9 BC	107.7 A-E	41.6 BCD	11.6
Millennium	S	7.4 BC	100.2 B-E	39.8 D	47.1
Goldeneye	S	8.3 BC	93.8 DEF	40.5 D	35.1
Herald	S	8.5 BC	88.7 EF	41.5 CD	14.8
PI 383933	VS	16.0 B	10.9 I	28.0 E	20.5
YU510-559	VS	36.2 A	41.2 H	28.9 E	79.4
YU510-510	VS	45.8 A	58.1 GH	32.5 E	92.2
P (α=0.05)		<.0001	<.0001	<.0001	

Web Resources for Southcentral and Southeast Idaho Grain Production

The 2018 Small Grains Report Print Edition is Proudly Sponsored by: