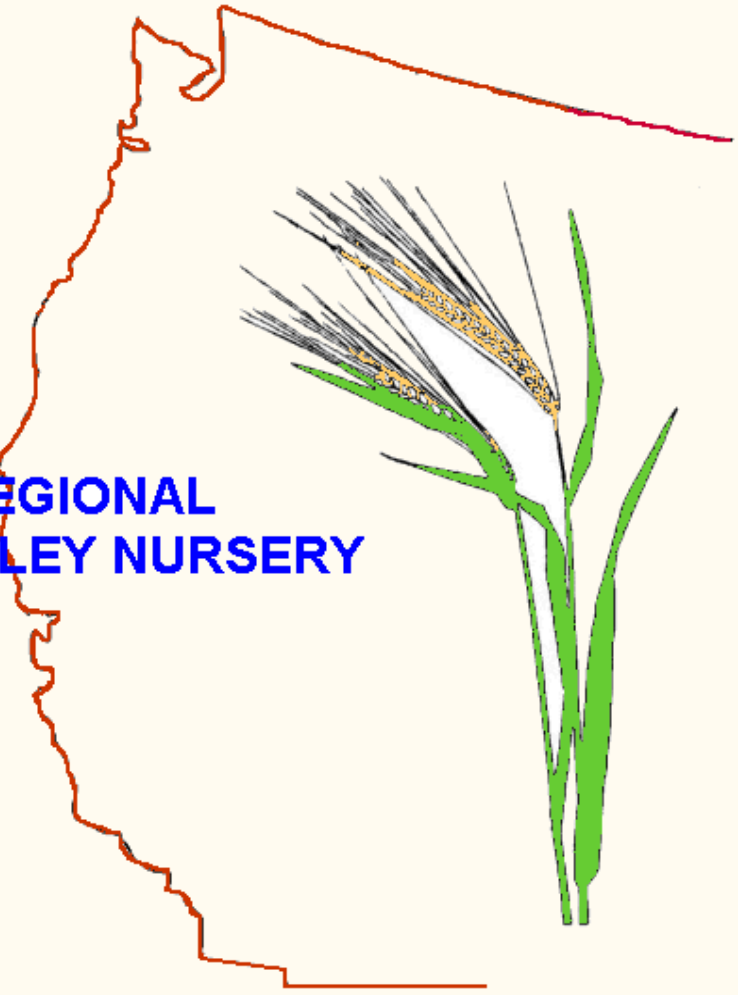
2015



WESTERN REGIONAL SPRING BARLEY NURSERY

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
NORTHERN PLAINS AND PACIFIC WEST REGION
in cooperation with
State Agricultural Experiment Stations

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USDA

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State Agricultural Experiment Stations

WESTERN REGIONAL SPRING BARLEY NURSERY

2015

Compiled by C. A. Erickson, Charles.Erickson@ars.usda.gov, Agronomist, USDA-ARS

This report is compiled in electronic format intended for transmittal to the nursery cooperators. The files and their contents are as follows:

2015WRBNREPORT.doc: WORD© document explaining the contents of the report with the following sections:

- Cover Page and Contents Page
- Location of Experiments and Personnel
- Western Regional Spring Barley Nursery Narrative
  - Nursery contents and locations
  - General Information
  - Data Analysis
  - Data Highlights
  - Data Tables

2015WRSBNDATA.xls: Excel© files containing data for the 2015 Western Regional Spring Barley Nursery in both English and metric format.

This is a joint progress report of cooperative investigations underway in the State Agricultural Experiment Stations and the Agricultural Research Service of the U.S. Department of Agriculture. This report is primarily a tool for use by cooperators, their official staffs and those persons having direct and special interest in the development of agricultural research programs.

This report includes data furnished by the State Agricultural Experiment Stations as well as by the Agricultural Research Service and was compiled in the Northern Plains Area and the Pacific West Area, Agricultural Research Service, U.S. Department of Agriculture. Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

National Small Grains Germplasm Research Facility, Aberdeen, Idaho, 2015

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LOCATION OF EXPERIMENTS AND PERSONNEL

California	
Tule Lake	Phil Mayo, prmayo@ucdavis.edu University of California at Davis
Idaho	
Aberdeen	Charles Erickson, Charles.Erickson@ars.usda.gov, Gongshe Hu, Gongshe.Hu@ars.usda.gov, Phil Bregizer, Phil.Bregizer@ars.usda.gov, Chris Evans, Chris.Evans@ars.usda.gov, Kathy Satterfield, Kathy.Satterfield@ars.usda.gov, USDA-ARS
Idaho Falls	Jason Heward, jason.heward@anheuser-busch.com, Busch Agricultural Resources, Inc (BARI)
Tetonia	Gongshe Hu, Gongshe.Hu@ars.usda.gov, Chris Evans, Chris.Evans@ars.usda.gov, Kathy Satterfield, Kathy.Satterfield@ars.usda.gov, USDA-ARS, Todd Carver, tcarver@uidaho.edu, Univ. Idaho
Minnesota	
St. Paul	Brian J. Steffenson, bsteffen@umn.edu, Univ. of Minnesota. Yue Jin, yuejin@umn.edu, USDA-ARS, Cereal Disease Laboratory
Montana	
Bozeman	Jamie Sherman, jsherman@montana.edu Montana State University (MSU),
Fairfield	Jason Heward, jason.heward@anheuser-busch.com, Busch Agricultural Resources, Inc (BARI)
North Dakota	
Hettinger	John Rickertsen, john.rickertsen@ndsu.edu, North Dakota State University (NDSU)
McVille	Rich Horsley, richard.horsley@ndsu.edu Martin R. Hochhalter, martin.hochhalter@ndsu.edu, NDSU
Minot	Rich Horsley, richard.horsley@ndsu.edu Martin R. Hochhalter, martin.hochhalter@ndsu.edu, NDSU
Williston	Diana Amiot, diana amiot y@ndsu.edu, Gautam Pradhan, Gautam.pradhan@ndsu.edu. NDSU
Saskatchewan	
Saskatoon, Canada	Aaron Beattie, aaron.beattie@usask.ca, Shelley Duncan shelley.duncan@usask.ca. Univ. of Saskatoon
Utah	
Cache Junction	David Hole, david.hole@usu.edu, Justin Clawson, jwclaw@cc.usu.edu Utah State University (USU)
Washington	
Moses Lake	Michael McKay, michael.mckay@highlandspecialtygrains.com, Highland Specialty Grains
Pullman	Kevin Murphy, kmurphy2@wsu.edu, Xianming Chen, xiaming@wsu.edu, Max Wood, max_wood@wsu.edu, Washington State Univ. (WSU),
Mt. Vernon	Xianming Chen, xiaming@wsu.edu, (WSU)
Wyoming	
Powell	Andrea Pierson, apierso1@uwyo.edu. Wyoming Agricultural Research Station
Malting Quality	(separate report) http://www.ars.usda.gov/mwa/madison/ccru
Madison WI	Chris Martens, Chris.Martens@ars.usda.gov , USDA-ARS Cereal Crops Lab
Stem Rust	reported to individual cooperators
Njoro, Kenya	Ruth Wanyera, wanyerar@gmail.com, Kenya Agricultural Research Institute

Locations are shown on Fig. 1, page 19.

2015 WESTERN REGIONAL SPRING BARLEY NURSERY

The **Western Regional Spring Barley Nursery** is intended to be grown under all climatic conditions in the Pacific Northwest and Northern Great Plains. It contains both 2- and 6-rowed feed and malting barley.

2015 nursery sites that were harvested and summarized for yield and/or agronomic characters from 15 locations are:

(1) Tulelake, CA
(2) Aberdeen, ID
(3) Idaho Falls, ID
(4) Tetonia, ID
(5) Bozeman, MT
(6) Fairfield, MT
(7) Hettinger, ND
(8) McVille, ND
(9) Minot, ND
(10) Williston, ND
(11) Cache Valley, UT
(12) Moses Lake, WA
(13) Pullman, WA
(14) Powell, WY
(15) Saskatoon, SK, Canada

Disease observation nurseries were grown at St. Paul, MN, Pullman, WA, Mt. Vernon, WA, and Njoro, Kenya. The Ug99 disease ratings were not available from Njoro at the time of publication and will be sent to the cooperators. The barley malting data can be accessed on the USDA-ARS Cereal Crops Research malting barley research program website listed above.

General Information

The entry list for the 2015 Western Regional Spring Barley Nursery is shown in Table 1. In 2015, commercial cultivars were again entered into the nursery, including those from Busch Agricultural Resources (5 lines) and Highland Specialty Grains (2 lines

There were 32 entries in this nursery in 2015. Thirteen of the 33 entries (besides checks) in the 2014 WRSBN nursery were dropped in 2015. These were: 2Ab04-X01084-27 (USDA-ARS), tested 4 years; 2Ab07-X031098-31 and 2Ab07-X04M219-46 (USDA-ARS), tested 3 years; 2B09-3425 and 2B10-4162 (BARI), MT090180 and MT090190 (MSU), 2ND27705 (NDSU), 09WA-231.5, 09WA-203.24, and 09WA-228.13 (WSU), all tested 2 years; UT2136-96 ((USU) and 10WA-113.16 (WSU), tested 1 year. There were 12 new entries in the test. These were: 2B11-5283, and 2B12-5582 (BARI); BZ509-601 (HSG); 08ARS112-75 and 08ARS116-91 (USDA-ARS); MT124027 and MT124728 (MSU); UT10901-66 (USU); 09WA-232.16, 09WA-235.11, 11WA-105.11 and 11WA-107.20 (WSU).

Data Analysis

Computer software, in Excel© format, was used to obtain the cultivar means and period of years summary for all characteristics. With this software, we were also able to calculate the coefficient of variation (C.V.) and the Least Significant Difference (LSD) at the .05 level for grain yield. These two statistics are included to provide some indication of the variability in the individual test locations and an indication of cultivar rank at each location and the overall average.

Data Highlights

Seasonal measurements for the check cultivars Baronesse, Steptoe, Harrington, and CDC Metcalfe (Table 2), for 2009 through 2015, show that the check's mean grain yield for the 2015 season was higher than average for the years tested and 3nd highest of the seven years; Test weight was higher than average and 2nd highest of the seven years, plant height was the taller than average, heading date was 8 days earlier than average, percent plump barley was higher than average, and protein was slightly higher than average.

There were malting, feed and food types of barley in the 2015 nursery. The highest yielding entry over all locations was the 2-rowed feed cultivar BZ509-216 at 6.13 Mg ha^{-1} (Table 3), followed by 10WA-105.33 at 6.04 Mg ha^{-1}, 11WA-107.20 at 5.94 Mg ha^{-1}, 09WA-232.16 at 5.92 Mg ha^{-1}, BZ509-601 at 5.90 Mg ha^{-1}, and BZ509-448 at 5.83 Mg ha^{-1}, all 2-rowed feed type barleys. These 6 entries had statistically equal yields at the 95% confidence level. The highest yielding malting barley was 2B11-4949, ranked 8th at 5.69 Mg ha^{-1} and the next highest malting barley was 2B11-5283 ranked 9th at 5.66 Mg ha^{-1}. The check cultivars ranked 23rd or less. 2Ab09-X06F058HL-31, a hulled, high beta-glucan, food barley had the highest test weight at 706.4. The highest test weight feed barley was 11WA-107.20 (678.5 kg m^{-3}), and the highest malting barley was 2ND28065 (676.3 kg m^{-3}). Steptoe was the earliest maturing and 2Ab09-X06F084-51 the latest. UT10901-66 was the tallest entry and BZ509-448 the shortest. 2ND30724 had the highest percent plump barley at 93.2%.

In the period of years summary for 2009 through 2015 (Table 4), BZ509-216 (2-rowed feed type) was the highest yielding entry with at least two years data at 5.99 Mg ha^{-1}. 10WA-105.33 (2-rowed feed type) was the next highest yielding entry with 2 years data at 5.89 Mg ha^{-1}. The highest yielding malting type with at least 2 years of data was 2B11-5283 (2-rowed) ranked 9th at 5.66 Mg ha$^{-1.}$ Of the lines tested at least 2 years, 2Ab09-X06F058HL-31 had the highest test weight at 686.8 kg m^{-3}, and 2ND30724 had the highest percent plump barley at 93.4%.

Tables 5 through 12 present the 2015 WRSBN data summarized over locations for grain yield, test weight, height, heading date, plump barley, lodging, percent protein, and disease ratings.

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Table 1: 2015 Western Regional Spring Barley Nursery, Entry List

Seed Source	Entry Number		Entry	Parentage	TYPE	Grade	Years Tested
WSU	1		Steptoe	CI 15229	6 row	feed	6
USDA-ARS	2		Baronesse	PI 568246	2 row	feed	6
USDA-ARS	3		Harrington		2 row	malting	6
USDA-ARS	4		AC Metcalfe		2 row	malting	6
BARI	5		2B10-4378	2B99-2763-10 / 2B03-3669 // 2B05-0822 / 2B99-2763-10	2 row	malting	2
BARI	6		2B11-4949	MERIT 57 / MT050118	2 row	malting	2
BARI	7		2B11-5166	2B03-3604 / 2B06-1161	2 row	malting	2
BARI	8	*	2B11-5283	2B03-3785 / MT020162	2 row	malting	1
BARI	9	*	2B12-5582	2B05-0728 / 2B06-0929	2 row	malting	1
HSG	10		BZ509-216	CDC Copeland/Xena	2 row	feed	2
HSG	11		BZ509-448	Champion/ YU501-312	2 row	feed	2
HSG	12	*	BZ509-601		2 row	feed	1
USDA-ARS	13		2Ab08-X05M010-82	2B98-5312/98Ab11993	2 row	malting	2
USDA-ARS	14		2Ab09-X06F084-51	03AH3054/98Ab12019	2 row	hulled, high BG, food	2
USDA-ARS	15		2Ab09-X06F058HL-31	02HR4590/CDC Fibar	2 row	hulled, high BG, food	2
USDA-ARS	16	*	08ARS112-75	Lenetah / Newdale // 2B02-2925	2 row	malting	1
USDA-ARS	17	*	08ARS116-91	Amsterdam / Tetonia // Voyager	2 row	malting	1
MSU	18		MT100120	Hockett/X/LK644/EslickBC3F3	2 row	feed	2
MSU	19		MT100126	Hockett/X/LK644/EslickBC3F3	2 row	feed	2
MSU	20	*	MT124027	MT010158/MT070175	2 row	feed	1
MSU	21	*	MT124728	MT010158/MT070175	2 row	feed	1
NDSU	22		2ND28065	2ND21867/2ND24238	2 row	malting	2
NDSU	23		2ND30724	2ND25265/2ND26328	2 row	malting	2
USU	24		UT2183-85		6 row	feed	2
USU	25	*	UT10901-66		6 row	feed	1
WSU	26	*	09WA-232.16		2 row	feed	1
WSU	27	*	09WA-235.11		2 row	feed	1
WSU	28		10WA-105.33		2 row	feed	2
WSU	29		10WA-106.18		2 row	feed	1
WSU	30		10WA-106.19		2 row	feed	2
WSU	31	*	11WA-105.11		2 row	Feed	1
WSU	32	*	11WA-107.20		2 row	feed	1

* new entries

Table 2: Check Seasonal Measurements (2009-2015) of the Western Regional Spring Barley Nursery

Average of adjusted means of checks Baronesse, Steptoe, Harrington, and AC Metcalfe

Variety or Selection	Grain Yield	Test Weight	Heading Date	Plant Height	Plump Barley*	Protein
	Mg ha^{-1}	kg m^{-3}	From 1/1	cm	%	%
2009 Locations	16	12	12	14	10	5
Steptoe	5.624	625.6	181.7	73.5	93.9	10
Baronesse	6.141	687	187.4	72.3	93.5	10.5
Harrington	5.395	672.5	186.5	78.4	93	10.8
AC Metcalfe	5.307	678.1	185.96	80	92.97	11.09
2009 AVERAGE	5.617	665.80	185.39	76.05	93.34	10.60
2010 Locations	13	11	12	13	9	2
Steptoe	5.451	623.3	180.2	85.9	85.3	12.6
Baronesse	5.651	669.2	184	78.4	85.3	15.1
Harrington	5.042	655.1	184.3	82.2	85.1	15.2
AC Metcalfe	5.068	657.2	183.5	84	84.2	15.8
2010 AVERAGE	5.303	651.20	183.00	82.63	84.98	14.68
2015 Locations	15	15	12	14	12	6
Steptoe	5.284	617.5	169.6	79.6	90.6	11.8
Baronesse	5.358	666.0	172.2	74.8	90.8	13.0
Harrington	5.061	655.8	172.3	78.5	90.3	13.1
AC Metcalfe	4.845	665.7	172.7	80.4	89.3	13.6
2015 AVERAGE	5.137	651.25	171.68	78.32	90.24	12.89
2014 Locations	13	11	9	10	10	2
Steptoe	5.204	615.6	178.8	73.9	93.6	10.2
Baronesse	5.348	661.0	183.3	71.8	92.6	11.2
Harrington	4.797	640.4	183.9	76.8	89.8	11.1
AC Metcalfe	4.989	664.5	182.9	80.5	92.0	11.6
2014 AVERAGE	5.085	645.40	182.26	75.76	91.98	11.03
2012 Locations	14	11	9	8	12	3
Steptoe	4.967	595.0	175.1	82.1	89.3	11.4
Baronesse	5.173	647.8	180.3	76.9	85.2	12.3
Harrington	4.297	629.0	181.1	80.1	84.8	12.4
AC Metcalfe	4.206	635.5	180.3	84.1	85.9	13.3
2012 AVERAGE	4.661	626.86	179.19	80.79	86.30	12.33
2011 Locations	10	9	8	8	9	3
Steptoe	4.459	614.5	185	71.4	87.6	11.2
Baronesse	4.867	676.7	189	66.8	87.3	12.5
Harrington	4.291	655.4	189	66.6	87.6	12.4
AC Metcalfe	4.302	662.1	189	70.5	85.3	12.7
2011 AVERAGE	4.480	652.17	187.98	68.84	86.97	12.20
Average Sta/Years	**94**	**82**	**72**	**80**	**70**	**23**
Steptoe	**5.185**	**615.9**	**176.9**	**77.5**	**90.2**	**11.1**
Baronesse	**5.467**	**666.5**	**181.1**	**73.6**	**89.2**	**12.2**
Harrington	**4.875**	**648.7**	**181.4**	**77.3**	**88.6**	**12.3**
AC Metcalfe	**4.850**	**658.0**	**180.8**	**79.7**	**87.9**	**12.8**
BASE AVERAGE	**5.094**	**647.27**	**180.05**	**77.03**	**88.97**	**12.08**

Highest/Latest

Table 3: 2015 Western Regional Spring Barley Nursery, Means Summary

Entry Number	CULTIVAR/ DESIGNATION	GRAIN YIELD Mg ha^{-1}	Rank	TEST WEIGHT kg m^{-3}	HEADING DATE From 1/1	PLANT HEIGHT cm	PLUMP BARLEY* %	PROTEIN %
	Number of Locations**	13		13	10	13	8	2
1	Steptoe	5.284	24	617.5	169.6	79.6	90.6	11.8
2	Baronesse	5.358	23	666.0	172.2	74.8	90.8	13.0
3	Harrington	5.061	29	655.8	172.3	78.5	90.3	13.1
4	AC Metcalfe	4.845	31	665.7	172.7	80.4	89.3	13.6
5	2B10-4378	5.371	20	665.1	172.2	72.4	87.9	12.8
6	2B11-4949	5.691	8	659.3	172.2	72.7	89.0	12.8
7	2B11-5166	5.568	14	655.9	172.2	75.3	90.3	12.8
8	2B11-5283	5.657	9	665.2	172.0	78.8	90.6	12.8
9	2B12-5582	5.193	26	661.3	172.0	78.1	91.7	13.7
10	BZ509-216	6.123	1	661.8	172.8	82.7	89.3	12.2
11	BZ509-448	5.832	6	666.8	173.1	68.4	88.4	12.7
12	BZ509-601	5.904	5	678.3	171.9	77.7	87.7	12.8
13	2Ab08-X05M010-82	5.643	12	658.3	172.8	75.1	87.2	12.6
14	2Ab09-X06F084-51	5.084	27	656.1	174.4	82.5	88.9	14.7
15	2Ab09-X06F058HL-31	3.830	32	706.4	174.9	77.4	86.1	16.4
16	08ARS112-75	5.653	10	661.5	172.0	77.2	90.5	12.8
17	08ARS116-91	4.919	30	661.2	171.1	76.0	89.6	13.1
18	MT100120	5.474	16	674.0	172.9	81.5	92.3	11.7
19	MT100126	5.360	22	672.9	173.7	82.7	89.8	12.1
20	MT124027	5.370	21	657.0	172.1	75.4	89.5	12.1
21	MT124728	5.070	28	655.8	172.0	73.6	88.9	13.0
22	2ND28065	5.610	13	676.3	170.7	81.9	90.0	13.1
23	2ND30724	5.374	19	665.3	170.6	74.9	93.2	12.5
24	UT2183-85	5.473	17	654.4	170.4	79.6	91.1	13.0
25	UT10901-66	5.269	25	629.4	170.1	82.8	88.0	12.6
26	09WA-232.16	5.918	4	678.2	171.9	77.3	89.7	12.5
27	09WA-235.11	5.727	7	672.1	171.8	73.8	88.0	12.7
28	10WA-105.33	6.036	2	675.9	170.8	70.8	92.3	13.3
29	10WA-106.18	5.651	11	671.9	171.3	78.1	88.1	12.4
30	10WA-106.19	5.384	18	638.9	169.9	78.0	84.0	12.5
31	11WA-105.11	5.510	15	669.5	172.9	72.0	91.2	12.5
32	11WA-107.20	5.935	3	678.5	172.3	75.9	90.1	13.1
	MEAN:	**5.443**		**663.50**	**171.99**	**77.06**	**89.51**	**12.90**
	CHECK'S MEAN:	**5.137**		**651.25**	**171.68**	**78.32**	**90.24**	**12.89**
	CV %	**2.012**		**0.31**	**0.36**	**0.40**	**1.08**	**0.37**
	LSD (.05)	**0.320**		**11.88**	**0.95**	**2.93**	**2.86**	**0.69**

* Percent over sieve, 2-rowed >2.4mm, 6-rowed >2.2mm

Highest/Latest Earliest/Lowest

Table 4: Summary Across Locations and Years, Western Regional Spring Barley Nursery, 2009-2015.

Entry Number	CULTIVAR/ DESIGNATION	Grain Yield			Test Weight	Heading Date	Plant Height	Plump Barley*	Protein
		Station Years	Mg ha^{-1}	RANK	kg m^{-3}	From 1/1	cm	%	%
1	Steptoe	5.185	94	26	615.9	176.9	77.5	90.2	11.1
2	Baronesse	5.467	94	16	666.5	181.1	73.6	89.2	12.2
3	Harrington	4.875	94	30	648.7	181.4	77.3	88.6	12.3
4	AC Metcalfe	4.850	94	31	658.0	180.8	79.7	87.9	12.8
5	2B10-4378	5.426	28	18	654.2	172.5	71.9	88.0	12.3
6	2B11-4949	5.637	28	11	649.9	172.6	72.5	88.7	12.2
7	2B11-5166	5.577	28	12	645.1	172.9	74.2	89.7	12.2
8	2B11-5283	5.657	15	9	665.2	172.0	78.8	90.6	12.8
9	2B12-5582	5.193	15	25	661.3	172.0	78.1	91.7	13.7
10	BZ509-216	5.988	28	1	655.2	173.6	81.3	88.6	11.8
11	BZ509-448	5.708	28	8	658.5	174.2	67.8	88.7	12.2
12	BZ509-601	5.904	15	4	678.3	171.9	77.7	87.7	12.8
13	2Ab08-X05M010-82	5.419	41	19	649.3	176.3	75.0	86.6	11.9
14	2Ab09-X06F084-51	5.002	28	28	644.3	175.7	79.8	87.8	14.1
15	2Ab09-X06F058HL-31	3.970	28	32	686.8	174.6	76.2	85.9	15.6
16	08ARS112-75	5.653	15	10	661.5	172.0	77.2	90.5	12.8
17	08ARS116-91	4.919	15	29	661.2	171.1	76.0	89.6	13.1
18	MT100120	5.430	41	17	667.9	176.6	80.9	93.0	11.1
19	MT100126	5.330	41	22	668.5	176.9	81.9	91.4	11.4
20	MT124027	5.370	15	20	657.0	172.1	75.4	89.5	12.1
21	MT124728	5.070	15	27	655.8	172.0	73.6	88.9	13.0
22	2ND28065	5.481	41	15	670.3	174.0	79.1	91.1	12.3
23	2ND30724	5.234	28	24	657.7	170.6	74.6	93.4	12.2
24	UT2183-85	5.354	28	21	647.3	170.1	79.6	90.4	12.8
25	UT10901-66	5.269	15	23	629.4	170.1	82.8	88.0	12.6
26	09WA-232.16	5.918	15	3	678.2	171.9	77.3	89.7	12.5
27	09WA-235.11	5.727	15	6	672.1	171.8	73.8	88.0	12.7
28	10WA-105.33	5.885	28	5	670.0	171.3	70.1	91.9	12.9
29	10WA-106.18	5.708	28	7	666.5	171.5	75.9	87.1	12.0
30	10WA-106.19	5.506	28	14	646.9	170.7	76.6	85.9	12.1
31	11WA-105.11	5.510	15	13	669.5	172.9	72.0	91.2	12.5
32	11WA-107.20	5.935	15	2	678.5	172.3	75.9	90.1	13.1
	MEAN:	**5.318**			**656.1**	**175.6**	**76.6**	**89.3**	**12.4**
	CHECK'S MEAN:	**5.094**			**647.3**	**180.1**	**77.0**	**89.0**	**12.1**

**Percent over sieve, 2-rowed >2.4mm, 6-rowed >2.2mm

Highest overall

Highest 2+ years of data

Earliest /Lowest

Table 5: 2015 Western Regional Spring Barley Nursery, Grain Yield (Mg ha^{-1})

Ent. NO.	CULTIVAR/ DESIGNATION	AVERAGE Mg ha^{-1}	Rank	Rank Ave.	Tulelake CA	Aberdeen ID	Idaho Falls ID	Tetonia ID	Bozeman MT	Fairfield MT	Hettinger ND	McVille ND	Minot ND	Williston ND	Cache Junction UT	Moses Lake	Pullman WA	Powell WY	Saskatoon SK
1	Steptoe	**5.284**	**24**	**20.5**	3.926	6.429	6.035	4.515	4.764	5.160	5.810	5.350	7.051	2.800	5.176	5.530	2.419	10.552	3.766
2	Baronesse	**5.358**	**23**	**17.2**	4.454	6.025	6.535	4.612	5.152	7.084	5.470	5.303	5.922	**2.479**	4.803	5.793	3.386	9.175	4.182
3	Harrington	**5.061**	**29**	**22.9**	3.964	5.526	4.722	4.789	5.290	5.626	3.980	5.011	5.468	2.602	5.360	5.346	2.956	10.993	4.297
4	AC Metcalfe	**4.845**	**31**	**26.7**	4.108	5.531	4.916	4.520	5.007	5.546	4.180	4.889	5.394	2.060	5.486	5.255	2.795	9.128	3.866
5	2B10-4378	**5.371**	**20**	**19.5**	4.233	5.880	6.243	4.537	5.270	6.381	5.360	5.690	5.532	2.100	6.169	5.216	3.010	10.977	3.979
6	2B11-4949	**5.691**	**8**	**12.5**	4.770	6.111	6.942	4.004	5.620	6.615	5.470	6.142	6.388	3.080	5.098	5.543	3.010	11.927	4.650
7	2B11-5166	**5.568**	**14**	**13.9**	4.617	6.058	5.935	4.666	5.895	6.679	4.170	5.776	6.693	2.649	6.116	5.587	3.279	10.960	4.445
8	2B11-5283	**5.657**	**9**	**12.9**	4.838	6.466	6.723	4.967	5.932	5.967	4.780	5.646	6.070	2.565	6.161	5.428	3.279	12.105	3.941
9	2B12-5582	**5.193**	**26**	**21.1**	4.665	4.983	6.702	4.816	4.761	5.904	4.980	5.536	5.529	2.493	6.106	4.793	2.634	10.091	3.914
10	BZ509-216	**6.123**	**1**	**5.9**	5.461	6.816	6.368	4.752	5.632	7.054	6.010	6.390	7.051	2.854	6.727	6.213	3.171	12.800	4.553
11	BZ509-448	**5.832**	**6**	**9.7**	4.271	6.004	5.733	5.504	5.962	6.856	6.040	6.128	6.652	2.902	5.681	5.992	3.548	11.863	4.354
12	BZ509-601	**5.904**	**5**	**7.2**	4.770	6.042	7.667	5.509	5.900	7.249	6.020	6.269	6.304	3.045	6.249	5.814	3.279	10.065	4.395
13	2Ab08-X05M010-82	**5.643**	**12**	**11.1**	4.866	5.988	4.649	5.257	5.354	7.216	5.390	5.568	6.454	3.074	5.752	6.424	3.171	11.149	4.330
14	2Ab09-X06F084-51	**5.084**	**27**	**22.7**	3.983	5.225	6.432	4.187	5.570	6.206	4.070	5.622	4.629	2.228	5.960	5.801	2.634	10.181	3.544
15	2Ab09-X06F058HL-31	**3.830**	**32**	**31.3**	2.448	4.133	4.975	3.467	3.585	4.353	4.420	3.992	3.161	1.566	4.769	4.655	1.183	7.690	3.050
16	08ARS112-75	**5.653**	**10**	**14.2**	4.559	5.843	7.493	4.730	5.126	7.179	5.350	6.228	6.711	2.935	5.179	6.081	2.204	11.154	4.037
17	08ARS116-91	**4.919**	**30**	**24.0**	3.954	5.778	6.375	4.467	4.796	6.211	4.320	4.686	4.871	2.752	5.870	5.483	2.473	8.193	3.573
18	MT100120	**5.474**	**16**	**17.1**	3.945	5.708	6.651	4.843	5.586	6.527	4.790	5.468	6.370	2.484	5.686	5.667	2.365	11.571	4.462
19	MT100126	**5.360**	**22**	**18.9**	3.849	5.671	6.042	4.929	5.764	6.526	4.560	5.793	6.025	2.694	5.636	5.728	2.580	11.023	3.588
20	MT124027	**5.370**	**21**	**18.1**	4.578	5.305	6.073	5.214	5.100	6.886	4.760	5.810	5.446	2.357	5.143	5.754	3.010	10.657	4.472
21	MT124728	**5.070**	**28**	**22.6**	4.146	5.552	6.006	4.741	5.198	6.606	3.740	4.566	5.264	2.826	5.930	5.402	2.956	9.332	3.792
22	2ND28065	**5.610**	**13**	**12.8**	4.358	6.262	6.717	5.063	5.521	6.828	4.870	6.097	6.831	3.182	5.408	5.986	3.118	9.771	4.145
23	2ND30724	**5.374**	**19**	**20.8**	3.763	5.493	7.647	3.924	5.046	6.197	4.900	5.773	5.620	2.212	6.058	5.743	2.419	11.916	3.904
24	UT2183-85	**5.473**	**17**	**17.5**	4.300	5.913	7.606	4.236	5.299	6.205	4.410	5.414	5.541	2.280	6.471	6.025	2.903	11.410	4.102
25	UT10901-66	**5.269**	**25**	**19.7**	4.626	5.165	5.888	4.262	5.903	6.012	4.080	5.263	4.964	2.557	5.362	5.810	3.386	12.022	3.742
26	09WA-232.16	**5.918**	**4**	**8.3**	4.828	5.853	7.915	5.407	6.031	7.007	5.200	6.675	6.818	2.860	5.551	6.306	3.171	11.083	4.082
27	09WA-235.11	**5.727**	**7**	**13.7**	4.204	5.493	5.640	5.192	5.283	6.968	5.680	6.327	6.756	2.211	6.089	6.077	3.171	12.758	4.068
28	10WA-105.33	**6.036**	**2**	**8.5**	5.193	6.122	7.786	5.348	5.366	6.985	5.690	6.514	6.943	2.813	5.335	5.472	3.171	13.360	4.455
29	10WA-106.18	**5.651**	**11**	**11.9**	4.569	6.095	6.627	5.074	5.745	6.902	5.690	6.045	6.449	3.148	4.794	6.016	3.118	10.063	4.442
30	10WA-106.19	**5.384**	**18**	**17.6**	4.588	6.316	6.427	5.300	5.125	5.695	5.360	4.905	5.645	2.520	5.571	5.294	3.118	10.673	4.239
31	11WA-105.11	**5.510**	**15**	**16.7**	4.492	5.354	6.282	4.800	5.476	6.818	5.340	6.246	6.454	2.322	5.115	5.613	3.924	10.349	4.078
32	11WA-107.20	**5.935**	**3**	**10.4**	4.569	5.622	8.147	4.897	5.914	6.821	5.480	6.121	6.097	2.587	5.594	6.185	3.225	13.402	4.379
	Location Mean	**5.443**			4.367	5.790	6.434	4.775	5.351	6.446	5.010	5.664	5.972	2.601	5.638	5.688	2.940	10.887	4.088
	Check's Mean	**5.137**			4.113	5.878	5.552	4.609	5.053	5.854	4.860	5.138	5.959	2.485	5.206	5.481	2.889	9.962	4.028
	C.V. (%)	**2.012**			8.220	8.375		10.064	9.090		8.030	6.844	8.997	19.568	13.800	9.280	10.062	1.990	8.090
	LSD $_{.05}$	**0.320**			0.598	0.661		0.655	0.948		0.660	0.633	0.878	0.831	1.274	0.862	0.483	2.918	0.458
	Replications	**15**			3	3		3	3		3	3	3	3	3	3	3	3	3

Table 6: 2015 Western Regional Spring Barley Nursery, Test Weight (kg m^{-3})

Ent. NO.	CULTIVAR/ DESIGNATION	AVERAGE kg m^{-3}	Rank	Tulelake CA	Aberdeen ID	Idaho Falls ID	Tetonia MT	Bozeman ND	Fairfield ND	Hettinger ND	McVille ND	Minot UT	Williston WA	Cache Junction WA	Moses Lake WY	Pullman	Powell	Saskatoon SK
1	Steptoe	**617.5**	**32**	621.6	595.9	564.2	637.1	624.1	585.8	601.0	653.1	752.8	582.1	617.8	568.9	621.6	652.0	593.4
2	Baronesse	**666.0**	**13**	664.1	655.1	644.5	674.4	676.4	678.8	673.1	723.0	741.2	643.2	632.3	636.7	624.2	670.8	662.4
3	Harrington	**655.8**	**28**	649.9	653.8	632.7	666.7	681.2	653.8	647.4	686.8	734.7	658.9	620.0	627.7	612.6	657.3	662.8
4	AC Metcalfe	**665.7**	**14**	651.2	649.9	639.6	677.0	670.9	661.0	653.8	743.8	734.7	667.3	641.8	635.4	644.8	664.6	660.4
5	2B10-4378	**665.1**	**17**	653.8	649.9	656.9	674.4	672.2	684.2	651.2	720.4	698.4	659.1	646.6	628.4	655.1	674.8	660.1
6	2B11-4949	**659.3**	**22**	648.6	642.2	657.7	669.2	674.9	673.9	651.2	702.3	732.1	658.4	651.3	599.7	631.9	655.7	649.2
7	2B11-5166	**655.9**	**26**	651.2	635.8	614.9	668.0	671.9	673.1	655.1	689.3	704.9	655.1	675.2	621.2	631.9	649.9	650.5
8	2B11-5283	**665.2**	**16**	665.4	652.5	642.5	664.1	678.8	684.9	655.1	707.5	732.1	655.0	675.4	627.7	633.2	671.5	642.6
9	2B12-5582	**661.3**	**20**	662.8	640.9	655.3	664.1	673.2	678.2	646.1	723.0	741.2	654.5	668.4	583.0	637.1	662.2	639.4
10	BZ509-216	**661.8**	**18**	675.7	646.1	640.4	674.4	673.7	670.0	661.5	714.0	702.3	644.1	664.3	634.9	628.1	647.8	659.2
11	BZ509-448	**666.8**	**12**	664.1	655.1	651.0	674.4	664.2	684.7	652.5	716.6	716.6	661.8	695.2	644.4	647.4	632.8	650.7
12	BZ509-601	**678.3**	**3**	677.0	657.7	660.7	689.8	689.3	698.3	666.7	743.8	698.4	651.0	723.6	623.3	655.1	683.0	666.4
13	2Ab08-X05M010-82	**658.3**	**23**	658.9	634.5	630.6	674.4	669.8	669.0	661.5	693.2	732.1	639.2	673.7	629.3	606.2	663.6	648.8
14	2Ab09-X06F084-51	**656.1**	**25**	668.0	643.5	657.1	674.4	671.4	662.3	655.1	698.4	653.1	643.4	666.6	638.0	599.7	656.9	662.3
15	2Ab09-X06F058HL-31	**706.4**	**1**	678.2	686.0	713.8	718.1	734.4	750.1	679.5	723.0	689.3	738.2	693.3	578.2	796.7	702.6	723.8
16	08ARS112-75	**661.5**	**19**	652.5	653.8	667.7	682.1	670.7	676.2	652.5	707.5	732.1	641.1	660.7	628.4	598.5	657.2	651.5
17	08ARS116-91	**661.2**	**21**	658.9	652.5	656.6	664.1	667.8	668.2	628.1	702.3	695.8	637.3	662.6	622.0	704.0	661.4	646.3
18	MT100120	**674.0**	**7**	648.6	640.9	668.2	698.8	688.7	690.3	669.2	720.4	750.2	657.4	667.6	633.6	653.8	674.2	657.5
19	MT100126	**672.9**	**8**	626.8	640.9	652.3	702.7	691.9	690.3	671.8	711.4	759.3	658.9	649.6	642.6	655.1	683.4	666.3
20	MT124027	**657.0**	**24**	648.6	639.6	632.2	678.2	668.5	675.9	651.2	702.3	723.0	652.1	611.5	633.6	635.8	656.1	656.5
21	MT124728	**655.8**	**27**	647.4	640.9	631.9	675.7	671.7	680.8	620.3	707.5	704.9	647.1	637.2	633.2	629.3	653.3	665.4
22	2ND28065	**676.3**	**5**	661.5	661.5	668.2	689.8	665.3	691.6	660.2	743.8	734.7	660.1	676.4	633.2	662.8	681.6	663.2
23	2ND30724	**665.3**	**15**	631.9	625.5	670.8	671.8	664.5	680.3	653.8	711.4	743.8	666.3	692.2	617.8	648.6	670.2	639.9
24	UT2183-85	**654.4**	**29**	664.1	633.2	653.8	657.7	659.5	646.8	637.1	695.8	695.8	650.2	667.4	617.8	648.6	659.6	637.5
25	UT10901-66	**629.4**	**31**	642.2	612.6	600.5	631.9	673.5	614.9	635.8	680.3	649.2	620.4	628.3	583.9	620.3	644.9	610.5
26	09WA-232.16	**678.2**	**4**	675.7	670.5	680.3	686.0	682.8	693.4	674.4	738.6	756.7	658.2	647.8	643.1	648.6	663.3	663.5
27	09WA-235.11	**672.1**	**9**	661.5	660.2	648.9	695.0	670.8	684.7	674.4	747.7	738.6	654.8	650.1	613.0	665.4	680.0	646.0
28	10WA-105.33	**675.9**	**6**	684.7	661.5	677.7	688.5	669.5	670.3	679.5	759.3	732.1	653.6	651.4	633.6	647.4	679.3	659.6
29	10WA-106.18	**671.9**	**10**	661.5	661.5	661.8	695.0	674.8	684.7	669.2	750.2	734.7	651.4	629.6	640.9	653.8	670.3	649.6
30	10WA-106.19	**638.9**	**30**	682.1	658.9	604.6	691.1	629.5	599.0	604.9	640.1	622.0	601.2	647.9	553.8	741.3	669.2	645.9
31	11WA-105.11	**669.5**	**11**	668.0	642.2	663.3	684.7	702.3	678.2	679.5	738.6	734.7	658.4	619.4	596.8	639.6	676.7	670.5
32	11WA-107.20	**678.5**	**2**	661.5	665.4	688.3	689.8	673.9	695.2	674.4	747.7	741.2	653.7	663.0	627.2	660.2	689.4	657.4
	Location Mean	**663.50**		657.66	647.09	649.66	677.27	672.33	672.79	655.08	713.84	719.28	651.05	656.51	619.69	648.08	666.12	653.70
	Check's Mean	**651.25**		646.72	638.67	620.27	663.77	663.16	644.85	643.82	701.65	740.85	637.89	627.98	617.15	625.80	661.18	644.75
	C.V. (%)	**0.312**		1.550				2.140		1.120	2.884	3.538	1.738		1.790	7.765	1.990	
	LSD $_{.05}$	**11.88**		16.99				28.06		11.97	747.65	41.53	18.47		18.02	82.14	0.11	
	Replications	**15**		3	3 Rep Bulk		3 Rep Bulk	3		3	3	3	3		3	3	3	1

Table 7: 2015 Western Regional Spring Barley Nursery, Plant Height (cm)

Ent. NO.	CULTIVAR/ DESIGNATION	AVERAGE cm	AVERAGE Rank	Tulelake CA	Aberdeen ID	Idaho Falls ID	Bozeman MT	Fairfield MT	Hettinger ND	McVille ND	Minot ND	Williston ND	Cache Junction UT	Moses Lake WA	Pullman WA	Powell WY	Saskatoon SK
1	Steptoe	**79.6**	**8**	94.0	87.1	106.7	63.7	77.5	81.3	74.3	82.3	48.0	104.1	73.7	67.8	87.2	66.7
2	Baronesse	**74.8**	**25**	83.8	83.8	94.0	64.7	81.3	81.3	63.2	74.5	40.7	88.9	69.8	63.5	89.7	67.5
3	Harrington	**78.5**	**11**	88.9	86.4	101.6	67.0	87.6	88.1	66.8	78.7	50.7	91.4	75.7	62.2	83.0	71.3
4	AC Metcalfe	**80.4**	**7**	88.9	89.7	96.5	74.7	86.4	94.0	65.5	84.5	40.7	88.9	78.3	65.5	94.8	77.2
5	2B10-4378	**72.4**	**29**	78.7	81.3	91.4	65.0	77.5	81.3	63.7	74.3	35.0	91.4	72.3	69.3	65.2	67.8
6	2B11-4949	**72.7**	**28**	81.3	72.9	91.4	65.3	78.7	85.1	66.3	71.8	43.3	86.4	73.0	61.5	69.4	70.8
7	2B11-5166	**75.3**	**22**	81.3	76.2	96.5	65.7	85.1	83.8	66.3	77.5	50.7	88.9	73.3	64.0	74.5	70.7
8	2B11-5283	**78.8**	**10**	88.9	83.8	101.6	70.0	85.1	86.4	68.5	79.7	51.7	88.9	76.7	67.8	84.7	69.5
9	2B12-5582	**78.1**	**12**	91.4	83.1	99.1	66.7	80.0	85.1	67.7	86.8	42.3	91.4	71.3	61.0	96.5	71.2
10	BZ509-216	**82.7**	**3**	96.5	92.2	96.5	72.0	92.7	92.7	74.0	86.5	53.0	96.5	76.5	69.1	85.5	73.5
11	BZ509-448	**68.4**	**32**	71.1	72.9	83.8	62.7	76.2	74.2	61.2	73.5	42.0	76.2	67.0	60.5	76.2	60.7
12	BZ509-601	**77.7**	**15**	86.4	85.6	101.6	71.3	86.4	85.1	67.7	80.2	47.7	91.4	73.0	55.4	85.5	70.3
13	2Ab08-X05M010-82	**75.1**	**23**	88.9	81.3	88.9	67.0	80.0	84.3	61.3	80.5	41.7	91.4	70.7	62.2	85.5	68.2
14	2Ab09-X06F084-51	**82.5**	**4**	94.0	90.7	104.1	69.7	92.7	83.8	70.3	93.7	55.0	91.4	77.2	66.5	91.4	74.8
15	2Ab09-X06F058HL-31	**77.4**	**16**	86.4	81.3	101.6	66.7	90.2	89.7	62.3	80.7	49.3	99.1	71.7	51.3	88.1	65.3
16	08ARS112-75	**77.2**	**18**	86.4	81.3	96.5	64.7	90.2	84.3	72.8	80.0	48.3	91.4	72.0	61.7	82.1	69.0
17	08ARS116-91	**76.0**	**19**	86.4	78.7	101.6	63.3	76.2	80.8	66.3	81.0	43.7	94.0	67.3	49.0	109.2	66.0
18	MT100120	**81.5**	**6**	94.0	87.1	101.6	73.7	94.0	84.6	68.5	88.0	51.7	104.1	67.3	69.3	83.0	74.2
19	MT100126	**82.7**	**2**	91.4	86.4	101.6	79.7	96.5	89.7	77.5	86.2	48.7	99.1	73.0	67.3	90.6	70.0
20	MT124027	**75.4**	**21**	86.4	78.7	88.9	69.7	85.1	81.8	69.5	73.2	45.0	91.4	68.2	66.0	80.4	71.5
21	MT124728	**73.6**	**27**	83.8	82.0	94.0	66.7	87.6	81.8	63.7	74.2	48.3	88.9	63.3	64.0	67.7	64.0
22	2ND28065	**81.9**	**5**	91.4	89.7	104.1	73.0	94.0	94.0	76.0	89.2	45.3	96.5	75.7	62.7	83.0	71.5
23	2ND30724	**74.9**	**24**	78.7	83.8	101.6	62.7	85.1	82.0	67.5	73.3	36.0	94.0	75.0	61.7	81.3	66.3
24	UT2183-85	**79.6**	**9**	99.1	89.7	111.8	66.3	80.0	87.6	69.3	78.5	33.7	96.5	74.3	65.3	88.1	73.7
25	UT10901-66	**82.8**	**1**	104.1	97.3	106.7	70.3	85.1	91.4	60.8	84.0	47.0	106.7	69.7	73.2	89.7	73.2
26	09WA-232.16	**77.3**	**17**	83.8	83.1	96.5	65.7	85.1	81.8	70.5	73.5	45.3	91.4	80.0	64.8	94.8	65.5
27	09WA-235.11	**73.8**	**26**	81.3	78.7	94.0	69.0	80.0	82.0	71.8	74.8	38.7	88.9	74.0	61.5	76.2	62.8
28	10WA-105.33	**70.8**	**31**	81.3	76.2	94.0	59.7	74.9	74.4	66.0	70.0	42.3	91.4	65.0	60.5	69.4	65.8
29	10WA-106.18	**78.1**	**13**	86.4	88.1	99.1	68.0	87.6	82.0	71.7	76.3	48.3	94.0	75.3	64.3	79.6	72.7
30	10WA-106.19	**78.0**	**14**	88.9	82.0	106.7	66.7	77.5	85.6	65.5	76.8	45.0	91.4	70.7	66.5	100.8	68.7
31	11WA-105.11	**72.0**	**30**	81.3	76.2	94.0	62.7	77.5	82.6	64.3	68.2	36.7	83.8	66.7	65.3	77.9	70.5
32	11WA-107.20	**75.9**	**20**	83.8	83.1	99.1	67.7	83.8	85.9	69.7	78.3	48.3	91.4	73.7	64.8	64.3	68.7
	Location Mean	**77.06**		86.36	83.38	98.35	67.65	84.30	84.58	67.83	79.08	45.13	92.55	72.29	63.61	83.61	69.36
	Check's Mean	**78.32**		88.90	86.74	99.70	71.00	83.19	86.17	67.45	80.00	45.00	93.35	74.38	64.77	88.69	70.67
	C.V. (%)	**0.403**		4.960	4.933		4.470		3.500	9.661	6.046	17.155			10.098		
	LSD $_{.05}$	**2.93**		7.19	5.61		5.88		4.83	10.70	7.80				10.48		
	Replications	**14**		3	3		3		3	3	3			3	3		3

Table 8: 2015 Western Regional Spring Barley Nursery, Heading Date (Days after Jan. 1)

Ent. NO.	CULTIVAR/ DESIGNATION	AVERAGE From 1/1	AVERAGE Rank	Tulelake CA	Aberdeen ID	Bozeman MT	Hettinger ND	McVille ND	Minot ND	Williston ND	Cache Junction UT	Moses Lake WA	Pullman WA	Powell WY	Saskatoon SK
1	Steptoe	**169.6**	**1**	127	163.0	209.0	172.0	175.3	177.7	173.0	159.0	162.0	168.0	163.0	186.3
2	Baronesse	**172.2**	**18**	126	166.7	210.3	176.0	181.3	179.0	178.7	162.0	166.0	168.0	164.0	188.0
3	Harrington	**172.3**	**22**	122	168.0	210.7	177.0	181.7	179.3	177.7	163.0	165.0	172.0	163.0	188.0
4	AC Metcalfe	**172.7**	**24**	127	169.3	210.3	176.0	181.3	180.0	178.3	164.0	166.0	169.0	163.0	187.7
5	2B10-4378	**172.2**	**19**	123	168.0	212.3	177.0	181.7	181.0	177.7	161.0	165.0	168.0	164.0	187.3
6	2B11-4949	**172.2**	**21**	125	169.7	211.3	176.0	182.0	179.0	176.3	162.0	165.0	168.0	164.0	188.3
7	2B11-5166	**172.2**	**20**	126	169.0	211.3	176.0	181.3	178.0	177.0	162.0	166.0	168.0	164.0	187.7
8	2B11-5283	**172.0**	**16**	125	167.7	211.0	177.0	181.3	178.3	176.0	162.0	166.0	170.0	163.0	187.0
9	2B12-5582	**172.0**	**15**	124	166.7	210.7	176.0	181.0	180.0	177.3	162.0	165.0	169.0	165.0	187.3
10	BZ509-216	**172.8**	**25**	127	169.3	212.0	177.0	181.7	178.7	177.0	162.0	165.0	169.0	166.0	188.3
11	BZ509-448	**173.1**	**29**	125	170.0	214.0	178.0	182.0	178.7	177.7	164.0	166.0	168.0	164.0	190.0
12	BZ509-601	**171.9**	**11**	126	166.7	212.7	175.0	181.3	178.3	177.3	160.0	165.0	168.0	165.0	187.3
13	2Ab08-X05M010-82	**172.8**	**26**	128	169.0	212.0	177.0	181.7	179.7	177.7	162.0	166.0	169.0	163.0	188.7
14	2Ab09-X06F084-51	**174.4**	**31**	131	170.7	213.7	180.0	182.0	181.0	179.0	165.0	167.0	169.0	164.0	190.0
15	2Ab09-X06F058HL-31	**174.9**	**32**	126	170.7	214.0	179.0	185.0	186.0	176.7	166.0	167.0	176.0	164.0	188.3
16	08ARS112-75	**172.0**	**13**	126	167.3	212.0	176.0	181.7	177.3	175.7	161.0	166.0	168.0	165.0	187.7
17	08ARS116-91	**171.1**	**8**	124	164.7	212.3	176.0	180.7	178.0	175.0	158.0	165.0	169.0	163.0	187.3
18	MT100120	**172.9**	**27**	127	168.0	213.0	176.0	182.0	178.0	177.7	162.0	167.0	169.0	166.0	189.0
19	MT100126	**173.7**	**30**	126	168.7	213.3	177.0	182.3	180.7	178.0	166.0	167.0	169.0	164.0	192.7
20	MT124027	**172.1**	**17**	126	165.0	210.3	176.0	181.7	180.0	177.3	162.0	167.0	169.0	164.0	187.3
21	MT124728	**172.0**	**14**	127	164.3	209.0	175.0	181.3	177.7	176.7	163.0	168.0	169.0	165.0	187.7
22	2ND28065	**170.7**	**6**	123	167.0	211.0	172.0	180.0	177.7	173.7	160.0	164.0	168.0	165.0	187.3
23	2ND30724	**170.6**	**5**	123	163.3	211.7	173.0	178.7	179.0	176.0	160.0	165.0	167.0	164.0	186.7
24	UT2183-85	**170.4**	**4**	122	166.7	211.3	171.0	180.0	176.0	174.7	159.0	164.0	168.0	165.0	186.7
25	UT10901-66	**170.1**	**3**	122	164.7	212.7	173.0	179.3	175.7	173.0	156.0	166.0	167.0	166.0	186.0
26	09WA-232.16	**171.9**	**12**	125	167.7	212.0	175.0	181.7	177.3	176.7	161.0	164.0	168.0	166.0	188.3
27	09WA-235.11	**171.8**	**10**	126	167.3	211.3	174.0	180.7	177.0	177.3	160.0	166.0	168.0	166.0	187.7
28	10WA-105.33	**170.8**	**7**	127	165.0	207.7	174.0	181.0	175.7	175.7	162.0	164.0	167.0	164.0	187.0
29	10WA-106.18	**171.3**	**9**	122	164.0	210.3	175.0	180.7	177.0	178.0	163.0	165.0	169.0	163.0	188.0
30	10WA-106.19	**169.9**	**2**	125	165.7	206.7	173.0	176.0	175.3	173.7	163.0	161.0	168.0	164.0	187.3
31	11WA-105.11	**172.9**	**28**	126	168.0	212.7	175.0	181.7	178.0	179.3	163.0	168.0	168.0	167.0	188.7
32	11WA-107.20	**172.3**	**23**	129	168.3	212.0	175.0	181.7	179.0	175.7	163.0	166.0	168.0	163.0	187.3
	Location Mean	**171.99**		126.00	167.19	211.39	176.00	180.99	178.56	176.60	161.81	165.00	168.69	164.34	187.91
	Check's Mean	**171.68**		125.50	166.75	211.30	175.25	179.90	179.00	176.92	162.00	164.75	168.33	163.25	187.50
	C.V. (%)	**0.358**		2.180	0.801	0.600	0.470	0.268	0.872	5.414			0.893		1.070
	LSD $_{.05}$	**0.95**		4.56	1.82	2.47	1.34	0.79	2.54	2.26			2.46		1.41
	Replications	**12**		3	3	3	3	3	3	3		3	3		3

Table 9: 2015 Western Regional Spring Barley Nursery, Percent Plump Barley*

Ent. NO.	CULTIVAR/ DESIGNATION	AVERAGE Percent	AVERAGE Rank	Aberdeen ID	Idaho Falls ID	Tetonia ID	Bozeman MT	Fairfield MT	Hettinger ND	Williston ND	Moses Lake WA	Pullman WA	Powell WY
1	Steptoe	**90.6**	**9**	89.9	87.4	96.2	92.4	88.5	92.9	97.1	98.2	91.0	98.4
2	Baronesse	**90.8**	**7**	94.5	89.8	95.8	88.5	96.8	94.5	91.9	98.8	87.0	98.3
3	Harrington	**90.3**	**12**	92.0	89.6	96.2	91.2	94.9	92.7	92.7	98.8	85.0	97.8
4	AC Metcalfe	**89.3**	**20**	91.8	84.2	96.1	91.1	93.3	90.6	84.7	98.8	91.0	98.3
5	2B10-4378	**87.9**	**28**	90.6	90.5	95.9	87.9	95.2	89.0	83.3	96.6	79.0	98.3
6	2B11-4949	**89.0**	**21**	91.5	93.0	96.9	93.2	94.7	89.6	82.9	94.0	86.0	97.6
7	2B11-5166	**90.3**	**11**	94.0	89.1	97.1	91.0	96.2	95.5	87.6	96.6	90.0	97.9
8	2B11-5283	**90.6**	**8**	94.8	95.3	97.5	92.0	97.8	93.4	84.2	98.8	87.0	98.0
9	2B12-5582	**91.7**	**4**	92.7	95.1	96.6	92.2	98.3	95.1	90.2	98.0	92.0	97.9
10	BZ509-216	**89.3**	**19**	92.6	88.5	97.4	91.9	96.1	92.8	86.1	98.2	82.0	96.5
11	BZ509-448	**88.4**	**24**	86.3	76.1	95.0	92.9	96.5	90.4	93.3	99.0	85.0	95.3
12	BZ509-601	**87.7**	**29**	87.0	93.7	94.9	87.8	96.6	94.1	79.4	97.6	74.0	97.9
13	2Ab08-X05M010-82	**87.2**	**30**	86.6	90.2	94.6	86.4	94.6	93.7	85.6	98.4	71.0	97.2
14	2Ab09-X06F084-51	**88.9**	**23**	91.6	95.2	96.4	88.3	94.6	94.6	91.0	96.4	75.0	97.6
15	2Ab09-X06F058HL-31	**86.1**	**31**	91.8	94.1	89.3	92.7	95.2	93.5	77.0	97.2	65.0	96.8
16	08ARS112-75	**90.5**	**10**	93.5	95.3	96.4	90.1	97.0	90.3	90.0	98.6	88.0	96.6
17	08ARS116-91	**89.6**	**17**	92.7	94.8	94.9	89.1	94.7	86.9	90.3	96.2	90.0	97.4
18	MT100120	**92.3**	**2**	91.6	96.1	97.5	94.8	98.1	95.3	91.9	97.6	90.0	98.8
19	MT100126	**89.8**	**15**	90.7	90.4	97.0	93.0	97.1	92.6	77.4	97.6	87.0	98.4
20	MT124027	**89.5**	**18**	92.7	91.1	95.1	88.7	96.3	91.8	87.1	98.6	88.0	98.4
21	MT124728	**88.9**	**22**	92.6	93.8	93.7	86.7	96.2	87.6	87.1	97.5	83.0	98.5
22	2ND28065	**90.0**	**14**	89.6	90.8	96.5	90.7	96.5	89.0	91.4	97.2	89.0	98.7
23	2ND30724	**93.2**	**1**	91.5	97.9	98.7	95.5	98.1	96.6	94.8	97.8	95.0	98.4
24	UT2183-85	**91.1**	**6**	93.3	97.1	92.7	93.2	92.8	91.0	96.8	97.0	87.0	99.1
25	UT10901-66	**88.0**	**26**	87.2	87.4	87.0	92.0	92.6	89.7	95.8	97.0	81.0	98.3
26	09WA-232.16	**89.7**	**16**	90.5	96.6	94.8	87.4	97.8	93.7	86.5	98.4	79.0	98.3
27	09WA-235.11	**88.0**	**27**	86.7	86.0	95.9	84.7	94.4	94.7	81.9	97.6	82.0	98.6
28	10WA-105.33	**92.3**	**3**	92.7	98.0	96.8	90.8	97.8	96.5	93.9	98.8	90.0	99.1
29	10WA-106.18	**88.1**	**25**	88.2	90.8	95.8	86.9	96.3	92.6	84.3	98.4	75.0	97.3
30	10WA-106.19	**84.0**	**32**	86.7	94.4	95.1	92.5	91.8	92.6	86.0	98.0	30.0	98.0
31	11WA-105.11	**91.2**	**5**	91.8	95.3	96.8	91.6	96.8	96.3	90.2	98.2	87.0	97.8
32	11WA-107.20	**90.1**	**13**	86.5	96.3	95.2	88.0	96.8	94.0	93.4	97.0	84.0	98.6
	Location Mean	**89.51**		90.89	91.99	95.48	89.93	95.64	92.60	88.30	97.72	82.65	97.95
	Check's Mean	**90.24**		92.05	87.77	96.08	72.80	93.37	92.68	91.58	98.65	91.33	98.20
	C.V. (%)	**1.081**					2.710		1.880	7.336		6.159	
	LSD .05	**2.86**					4.75		2.84	10.57		8.31	
	Replications	**12**		3 Rep Bulk		3 Rep Bulk	3		3	3		3	

*Percent over sieve, 2-rowed >2.4mm, 6-rowed >2.2mm

Table 10: 2015 Western Regional Spring Barley Nursery, Percent Protein

Ent. NO.	CULTIVAR/ DESIGNATION	AVERAGE Percent	AVERAGE Rank	Aberdeen ID	Tetonia ID	Bozeman MT	Hettinger ND	Williston ND
1	Steptoe	**11.8**	**31**	12.4	11.5	10.4	10.5	13.7
2	Baronesse	**13.0**	**12**	12.6	13.8	11.1	11.5	13.9
3	Harrington	**13.1**	**6**	12.5	14.5	11.0	11.5	14.1
4	AC Metcalfe	**13.6**	**4**	13.8	14.9	10.7	12.1	15.2
5	2B10-4378	**12.8**	**13**	12.7	13.5	10.8	11.0	14.9
6	2B11-4949	**12.8**	**16**	14.1	13.7	10.3	11.1	13.8
7	2B11-5166	**12.8**	**15**	13.1	14.6	11.1	11.0	13.6
8	2B11-5283	**12.8**	**18**	11.9	12.1	11.1	12.4	14.7
9	2B12-5582	**13.7**	**3**	13.4	14.5	11.5	11.6	15.3
10	BZ509-216	**12.2**	**28**	10.9	13.8	9.7	10.7	13.7
11	BZ509-448	**12.7**	**19**	12.5	13.6	10.5	10.5	14.9
12	BZ509-601	**12.8**	**14**	12.9	13.3	11.0	11.7	13.6
13	2Ab08-X05M010-82	**12.6**	**21**	12.0	14.5	10.1	11.1	13.1
14	2Ab09-X06F084-51	**14.7**	**2**	13.6	15.3	10.9	13.5	18.7
15	2Ab09-X06F058HL-31	**16.4**	**1**	16.8	15.3	15.0	13.8	19.8
16	08ARS112-75	**12.8**	**17**	13.1	14.9	10.2	10.2	14.1
17	08ARS116-91	**13.1**	**9**	13.3	13.2	11.6	11.8	14.0
18	MT100120	**11.7**	**32**	11.9	12.5	9.6	10.0	13.4
19	MT100126	**12.1**	**29**	13.4	12.8	9.4	10.1	13.9
20	MT124027	**12.1**	**30**	11.9	12.8	9.7	10.2	14.0
21	MT124728	**13.0**	**10**	12.5	13.1	11.1	11.8	14.0
22	2ND28065	**13.1**	**8**	13.9	13.7	11.1	11.7	14.6
23	2ND30724	**12.5**	**24**	12.0	11.6	11.1	11.5	15.0
24	UT2183-85	**13.0**	**11**	12.8	13.8	11.0	12.3	14.4
25	UT10901-66	**12.6**	**22**	11.4	12.5	11.4	12.5	14.2
26	09WA-232.16	**12.5**	**25**	12.5	12.1	10.8	11.4	14.1
27	09WA-235.11	**12.7**	**20**	13.1	13.6	10.3	11.0	14.0
28	10WA-105.33	**13.3**	**5**	12.7	13.9	10.9	12.0	14.5
29	10WA-106.18	**12.4**	**27**	12.7	12.5	9.7	10.7	14.6
30	10WA-106.19	**12.5**	**26**	12.5	13.0	10.5	10.4	13.2
31	11WA-105.11	**12.5**	**23**	13.1	12.7	11.0	11.0	13.2
32	11WA-107.20	**13.1**	**7**	12.7	14.7	11.0	11.2	14.7
	Location Mean	**12.90**		12.81	13.55	10.80	11.40	14.47
	Check's Mean	**12.89**		12.83	13.68	10.93	11.40	14.24
	C.V. (%)	**0.371**				5.460	3.750	6.842
	LSD $_{.05}$	**0.69**				1.15	0.70	1.62
	Replications	**6**		3 Rep Bulk	3 Rep Bulk	3	3	3

Table 11: 2015 Western Regional Spring Barley Nursery, Lodging, 0-10*

Ent. NO.	CULTIVAR/ DESIGNATION	AVERAGE Rating	AVERAGE Rank	Tulelake CA	Aberdeen ID	Idaho Falls ID	Bozeman MT	Fairfield MT	Hettinger ND	Williston ND	Cache Junction UT	Moses Lake WA	Pullman WA	Powell WY
1	Steptoe	**1.93**	**24**	1.0	0.3	9.0	0.0	1.0	1.7	4.7	8.0	1.0	0.0	1.0
2	Baronesse	**2.21**	**29**	1.3	2.0	6.0	0.0	1.0	3.3	4.7	7.0	1.0	0.0	1.7
3	Harrington	**2.40**	**32**	2.0	2.0	6.5	0.0	1.0	4.3	5.3	6.0	1.0	0.0	1.7
4	AC Metcalfe	**1.59**	**16**	1.0	0.7	9.0	0.0	1.0	2.0	3.7	5.0	1.0	0.0	1.3
5	2B10-4378	**1.60**	**17**	1.0	0.3	6.0	0.0	1.0	2.0	5.0	3.0	1.0	0.0	1.0
6	2B11-4949	**1.48**	**11**	1.0	0.0	2.0	0.0	1.0	1.7	5.0	1.5	1.0	0.0	1.7
7	2B11-5166	**1.44**	**9**	1.0	0.0	8.0	0.0	1.0	2.7	5.3	0.0	1.0	0.0	1.0
8	2B11-5283	**1.59**	**15**	1.0	0.7	4.5	0.0	1.0	3.0	5.3	0.5	1.0	0.0	1.3
9	2B12-5582	**1.32**	**6**	1.3	0.0	5.0	0.0	1.0	2.3	4.7	0.0	1.0	0.0	1.0
10	BZ509-216	**1.26**	**5**	1.0	0.7	7.0	0.0	1.0	2.3	4.3	0.0	1.0	0.0	0.7
11	BZ509-448	**1.34**	**8**	1.0	0.7	5.0	0.0	1.0	3.7	3.3	0.0	1.0	0.0	2.3
12	BZ509-601	**1.33**	**7**	1.0	0.7	6.0	0.0	1.0	1.0	5.0	0.0	1.0	0.0	1.3
13	2Ab08-X05M010-82	**1.45**	**10**	1.3	1.0	9.0	0.0	1.0	2.3	4.7	0.8	1.0	0.0	0.7
14	2Ab09-X06F084-51	**1.10**	**1**	1.3	0.0	3.5	0.0	1.0	0.0	4.3	0.0	1.0	0.0	1.3
15	2Ab09-X06F058HL-31	**1.19**	**3**	1.3	1.7	1.5	0.0	1.5	1.0	2.7	0.0	1.0	0.0	3.3
16	08ARS112-75	**1.56**	**14**	1.0	0.3	2.0	0.0	1.0	2.0	5.3	1.2	1.0	0.0	1.7
17	08ARS116-91	**1.68**	**19**	1.3	0.3	2.5	0.0	1.0	6.0	4.3	1.0	1.0	0.0	1.0
18	MT100120	**1.25**	**4**	1.0	0.0	4.0	0.0	1.0	4.0	3.7	0.0	1.0	0.0	1.0
19	MT100126	**1.49**	**12**	1.0	0.0	9.0	0.0	1.0	3.7	5.0	0.0	1.0	0.0	1.3
20	MT124027	**2.07**	**26**	1.0	0.0	7.5	0.0	1.0	4.0	4.7	7.0	1.0	0.0	1.7
21	MT124728	**1.79**	**21**	1.3	0.3	7.5	0.0	1.0	6.0	4.7	1.0	1.0	0.0	1.7
22	2ND28065	**1.65**	**18**	1.0	0.3	8.0	0.0	1.0	2.3	5.0	3.0	1.0	0.0	1.3
23	2ND30724	**1.12**	**2**	1.0	0.0	2.0	0.0	1.0	0.3	4.3	0.0	1.0	0.0	1.7
24	UT2183-85	**1.80**	**22**	1.0	0.0	1.0	0.0	1.0	1.3	4.7	6.5	1.0	0.0	1.7
25	UT10901-66	**2.30**	**31**	1.0	0.0	8.5	0.0	1.0	2.7	6.0	8.5	1.0	0.0	1.3
26	09WA-232.16	**2.28**	**30**	1.0	1.7	3.5	0.0	1.0	2.0	5.0	7.5	3.0	0.0	1.3
27	09WA-235.11	**1.53**	**13**	1.0	1.0	8.0	0.0	1.0	2.7	3.3	5.0	1.0	0.0	0.3
28	10WA-105.33	**2.16**	**28**	2.0	3.0	3.0	0.0	1.0	1.7	5.7	4.0	1.0	0.0	1.7
29	10WA-106.18	**2.10**	**27**	1.0	1.3	6.5	0.0	1.0	2.0	5.3	7.0	1.0	0.0	1.3
30	10WA-106.19	**1.88**	**23**	1.3	2.7	9.0	0.0	1.5	1.7	4.0	5.0	1.0	0.0	2.0
31	11WA-105.11	**1.69**	**20**	2.3	1.0	5.0	0.0	1.0	0.7	2.3	8.0	1.0	0.0	1.7
32	11WA-107.20	**1.99**	**25**	1.0	0.7	2.0	0.0	1.0	2.0	5.0	7.0	1.0	0.0	1.3
	Location Mean	**1.67**		1.20	0.75	5.53	0.00	1.03	2.40	4.57	3.23	1.06	0.00	1.42
	Check's Mean	**2.03**		1.33	1.25	7.63	0.00	1.00	2.83	4.58	6.50	1.00	0.00	1.42
	C.V. (%)	**0.29**		34.96	85.83				36.82	36.343				
	LSD $_{.05}$	**0.76**		0.69	0.87				1.47					
	Replications	**12**		3	3				3					

***** 0.0 to 10.0 where 0.0 = no lodging, 10.0 = complete lodging, calculated as (((% of plot area lodged)/100)*((% lodged [lean]))/100))*10; i.e. ((90/100)*(90/100))*10=(.9*.9)*10=8.1

** Determined by missing value analysis

Table 12: 2015 Western Regional Spring Barley Nursery, Disease Ratings

Entry No.	CULTIVAR/ DESIGNATION	Stripe Rust						Foliar Disease**	Foliar Disease†	Straw Breakage‡
		Pullman, WA**		Mt. Vernon, WA				Idaho Falls, ID	Minot, ND	
		7/8		5/28		6/25				
		S. dough		Stem elong.		S. dough				
		IT*	%	IT	%	IT	%	%	1-9	1-5
		No rust				No rust				
1	Steptoe			2	10			68	5.3	4.3
2	Baronesse			2	10			60	6.3	3.7
3	Harrington			2	10			68	7.7	5.0
4	AC Metcalfe			2	10			50	5.7	3.7
5	2B10-4378			2	10			58	6.7	3.7
6	2B11-4949			2	10			65	6.0	1.7
7	2B11-5166			2	10			53	7.0	4.3
8	2B11-5283			2	10			65	6.0	3.7
9	2B12-5582			2	10			60	6.7	3.0
10	BZ509-216			8	30			48	5.0	3.7
11	BZ509-448			2	10			60	5.3	4.7
12	BZ509-601			5	30			60	5.7	4.0
13	2Ab08-X05M010-82			2	10			53	6.3	4.0
14	2Ab09-X06F084-51			2	10			63	6.0	2.3
15	2Ab09-X06F058HL-31			5	20			63	4.7	1.0
16	08ARS112-75			2	10			45	5.7	3.3
17	08ARS116-91			5	30			65	5.7	4.0
18	MT100120			2	10			65	6.7	4.3
19	MT100126			2	10			58	7.0	3.3
20	MT124027			2	20			50	6.0	3.0
21	MT124728			2	10			58	8.3	5.0
22	2ND28065			2	10			48	6.0	4.3
23	2ND30724			2	10			53	7.3	1.7
24	UT2183-85			2	10			70	7.7	1.0
25	UT10901-66			2	10			65	7.7	2.3
26	09WA-232.16			5	10			55	6.0	4.0
27	09WA-235.11			8	20			65	6.7	3.3
28	10WA-105.33			2	10			48	5.3	4.7
29	10WA-106.18			8	20			55	5.7	4.0
30	10WA-106.19			5	10			68	8.0	1.0
31	11WA-105.11			5	10			48	5.7	3.3
32	11WA-107.20			8	20			53	6.3	3.0

* Infection Type (IT) was recorded based on the 0-9 scale with ITs 8 and 9 combined as 8 (the most susceptible reaction) in field data. Generally IT 0-3 are considered resistant, 4-6 intermediate, and 7-9 susceptible. Heterogenous reactions of an entry were indicated by two or more ITs separated by "," for most plants with the first IT and few plants with the second IT or connected with "-" for entries containing plants with continuous ITs.

** Scoring was conducted using a modified Stakman scale, where 0; to 1 represents high levels of resistance, 2 is intermediate and 3 is susceptible, 4 type pustules are not common on barley As barley gives a mesothetic reaction, the variety of pustule types is reflected in the scoring with the most common pustule type written first, followed by the minority types, in order of frequency If reduced receptivity is noted, it is scored a "0,(minority infection type)" , i.e. if only a single isolated 3 type pustule in present on an otherwise clean leaf it would be scored as 0, (3).

†Foliar disease scale (1=no foliar disease, 9=severe foliar disease).

‡Stem breakage scale: (1=no stem breakage, 5=complete stem breakage). Ratings recorded at harvest maturity.

Figure 1: Test locations (past and present)