

2011 Winter and Spring Wheat Variety Trials

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Introduction

Cereals are an important rotational crop for central Oregon. Soft white wheat has been the most important class for grain production over the years, but there have been a few years that hard red spring wheat acres were greater than the soft white wheat acres. In 2011, it is estimated that there were about 18,950 acres of wheat grown consisting of 7,950 acres of hard red spring wheat, 3,100 acres of soft white spring wheat, 7,900 acres of soft white winter wheat. The wheat acreage grown was approximately 41% hard red and 59% soft white wheat. Since 1998, wheat acreage grown has ranged from a high of about 18,950 acres in 2011, to a low of 10,300 acres grown in 2002, in Crook, Deschutes, and Jefferson counties.

Central Oregon is well situated to the markets in Portland, Oregon. Public and private Pacific Northwest plant breeders release new cereal varieties each year. To provide growers with accurate, up-to-date information on variety performance, a statewide variety-testing program was initiated in 1993 with funding provided by the Oregon State University (OSU) Extension Service, OSU Agricultural Experiment Station, Oregon Wheat Commission, and the Oregon Grains Commission. Central Oregon Agricultural Research Center (COARC) has participated in the program every year since 1993.

Results for the variety trial at Madras are summarized and also reported through extension publications, county extension newsletters such as the Central Oregon Ag Newsletter, as well as in other popular press media. Data are also summarized for all trials and are available on the OSU Cereals Extension web page (<http://cropandsoil.oregonstate.edu/wheat/>) and COARC web page (<http://oregonstate.edu/dept/coarc>). For future reference, use the web page for earliest access to data, as trial results are posted as soon as they are available.

Materials and Methods

The winter wheat trial was planted on October 6, 2010 and the spring wheat trial was planted on April 11, 2011. The entries were planted into, 4.5 ft by 20 ft plots at the rate of 30 seeds/ft² in 8 inch row spacing, with an Oyjord plot drill, in a randomized block design with four replications. Previous cropping histories for both trials were 4 years of alfalfa, one year of summer fallow and one year of oats for hay, respectively.

Soil samples were taken to a depth of 14 inches, the extent of the soil depth. The samples were analyzed by Agri-Source (Agri-Check) Laboratory at Umatilla, Oregon. Soil test results for winter wheat and spring wheat are presented in Tables 1 & 2.

The winter wheat variety trials were fertilized with 200 lbs/acre of 46-0-0-0 on October 4, 2010 and then 200 lbs/acre of 20-0-0-24 was applied on April 24, 2011. Total nitrogen (soil + fertilizer N) available to the plants were 213 lbs/acre. The spring wheat trial was fertilized with 350 lbs/acre of 46-0-0-0 on April 15, 2011. Nitrogen fertilizer goal is around 200 lb/N/acre soft white winter wheat and around 160 lb/N/acre for soft white spring wheat. The trials are fertilized for hard red or white wheat protein.

Weeds were controlled in the winter wheat on March 22, 2011 using 2pts/acre of Bison, 0.7 oz/acre Affinity Broadspec, 2pts/100 gal of Activate Plus. Weeds were controlled in the spring wheat trials with an application of 0.4 oz/acre Harmony Extra, 1.3 pts/acre of Starane NXT, and 2pts/100 gal of nonionic surfactant.

Stripe rust in the winter wheat trial was controlled on March 22, 2011 using Quilt at 5 oz/acre and Interlock at 4 oz/acre. Stripe rust was present in spring variety trial later in the season, but could not be treated because plants were at heading.

The trials were irrigated as needed with a 30-ft by 40-ft spacing, solid-set sprinkler (9/64-inch heads) irrigation system. Date of first irrigation for the winter wheat variety trial occurred on April 20, 2011 and the last irrigation occurred on July 13, 2011. Date of first irrigation for the spring wheat variety trial occurred on April 21, 2011 and the last irrigation was applied on August 9, 2011.

Heading dates were recorded when 50% heading occurred. Just prior to harvest, lodging scores (percent of plot) and plant height (inches) measurements were taken. Harvested area was approximately 15 ft by 4.5 ft (exact measurements were taken for each plot) for the winter and spring wheat trial. A Wintersteiger plot combine was used to harvest the entries. Harvest dates for the winter wheat trial was August 23, 2011 and September 7, 2011 for the spring wheat trial.

The grain samples were shipped to and processed at the OSU Hyslop Farm at Corvallis, Oregon. Percent protein was predicted by NIRS whole grain analyzer and is presented on an 11 % moisture basis. Yield is presented on a 12% moisture basis. Statistical analyses were conducted by analysis of variance (ANOVA) using general linear model, PROC GLM, of SAS version 9.1 (SAS Institute, Cary, NC, 2002). Treatment means were separated by Fisher's protected least significant difference (PLSD 0.05) test.

Results and Discussion

Winter Wheat Trial

The weather and growing conditions this year were cooler and wetter compared to other years.

Diseases were not present or detected in the trial and nor were there much for stripe rust in central Oregon compared to other PNW regions.

The winter wheat trial yield average was 120.8 bu/acre, and yields ranged from 80.9 to 159.2 bu/acre (Table 3). For the top-yielding 8 entries, 'Madsen' to 'OR2071073', there were no significant differences between varieties with a yield range of 139.5 to 159.2 bu/acre (PLSD 0.05, 21.9 bu/acre). The top 2 yielding entries were OSU experimental lines.

Average test weight for the trial was 61.2 lb/bu. Test weight ranged from a low of 58.7 lb/bu (OR2060323) to 63.6 lb/bu (Skiles).

Heading dates ranged from 156.0 days from January 1 (doy) to 164.8, or a range of 8.8 days. 'Goetze/Skiles Blend' was the earliest to head at 156.0 (doy); 'WA 8092' was the last entry to head at 164.8 (doy).

Average plant height was 35.8 inches for the trial. Heights ranged from 27.9 inches ('Goetze/Skiles Blend') to 38.5 inches ('AP 700CL' and "Tubbs 06").

The percent lodging average was slightly higher than in previous years, 12.9% for the trial. Lodging ranged from 0% (10 entries) to 40.0% ("OR2070608"); 21 entries had scores of 13% or more.

Protein average was 7.9% and ranged from 6.8 to 9.3%. These protein numbers would indicate the crop was short on nitrogen fertility. This was probably further exacerbated by the cool wet spring and early summer which increased yield potential.

Grain nitrogen uptake for the high and lowest yielding entries was 117 and 78 lb/acre. Average for the trial was 100 lb/N/acre.

Spring Wheat Trial

The weather and growing conditions this year were cooler and wetter compared to other years.

Only stripe rust was detected in the trial later in the season.

Most of central Oregon wheat fields were not affected by stripe rust compared to other PNW regions.

The spring wheat trial yield average was 112.0 bu/acre, and yields ranged from 83.2 to 135.5

bu/acre (Table 4). For the top-yielding 6 entries, ‘OR4051328’ to ‘UC 1618’, there were no significant differences between varieties with a yield range of 126.0 to 135.5 bu/acre (PLSD 0.05, 11.9 bu/acre).

Average test weight for the trial was 57.4 lb/bu. Test weight ranged from a low of 54.8 lb/bu (OR4051328) to 59.0 lb/bu (Whit). These test weights are lower than usual, is it possible that water was shut off just a little too early?

Heading dates ranged from 180.3 days from January 1 (doy) to 186.0, or a range of 5.7 days. ‘IDO 644 was the earliest to head at 180.3 (doy); ‘Cerere’ was the last entry to head at 186.0 (doy).

Average plant height was 35.5 inches for the trial. Heights ranged from 25.0 inches (‘UC 1617) to 42.7 inches (‘JD’’).

The percent lodging average was slightly lower than in previous years, 9.9% for the trial. Lodging ranged from 0% (21 entries) to 58.8% (‘Louise’’); 9 entries had scores of 10% or more.

Protein average was 10.4% and ranged from 9.0 to 12.6%.

Table 1. Soil test results from samples taken on August 31, 2010 for the statewide Winter Wheat Variety Trial, at Central Oregon Agricultural Research Center, Madras, Oregon.

Soil depth (in)	pH	NO ₃ ¹ (lb/acre)	NH ₄ (lb/acre)	P (ppm)	K (ppm)	S (ppm)
0-14	7.6	81	8	17	338	13.6

¹NO₃ = nitrate, NH₄ = ammonia, P = phosphorus, K = potassium, S = sulfur.

Table 2. Soil test results from samples taken on April 5, 2011 for the statewide Spring Wheat Variety Trial, at Central Oregon Agricultural Research Center, Madras, Oregon.

Soil depth (in)	pH	NO ₃ ¹ (lb/acre)	NH ₄ (lb/acre)	P (ppm)	K (ppm)	S (ppm)
0-14	7.6	27	13	13	155	6.8

¹NO₃ = nitrate, NH₄ = ammonia, P = phosphorus, K = potassium, S = sulfur.

Table 3. Statewide variety testing program for winter wheat, COARC, Madras, Oregon, 2011

Variety or line	Class ¹	Yield bu/acre	Test weight (lbs/bu)	Heading (doy)	Height (in)	Lodging (%)	Protein (%)
OR2071073	SWW	159.2	60.7	160.0	36.9	10.0	7.0
OR2071071	SWW	159.1	58.9	160.8	35.0	10.0	7.7
Tubbs 06	SWW	145.5	61.1	159.3	38.5	15.0	7.9
UICF-Brundage	SWW	143.8	61.5	159.8	35.1	16.3	8.8
AP 700CL	SWW	142.6	60.8	161.8	38.5	0.0	9.3
AP Badger	SWW	140.6	59.6	157.7	33.7	0.0	7.2

OR2080641	SWW	140.0	61.0	160.3	36.5	38.8	7.8
Madsen	SWW	139.5	61.7	162.3	37.0	3.8	8.6
OR2071628	SWW	136.8	60.7	160.3	35.5	0.0	7.9
Brundage 96	SWW	133.7	61.8	158.0	36.4	22.8	8.5
ORCF-101	SWW	133.0	61.5	162.3	37.3	15.0	8.1
Goetze/Skiles Blend	SWW	131.4	62.0	156.0	27.9	0.3	8.3
OR08047P94	SWW	130.5	60.2	159.8	33.8	0.0	7.3
OR2060395	SWW	126.8	60.4	159.8	37.3	12.5	7.4
OR2071029	SWW	126.5	59.6	161.0	34.1	0.0	7.1
SY Ovation (30PN-108#21)	SWW	125.9	61.9	158.8	37.0	12.5	8.0
NSA 06-2153A	SWW	125.3	60.8	156.5	33.0	7.5	6.9
Westbred 528	SWW	124.7	62.0	156.5	35.5	7.5	8.4
ORCF-102	SWW	124.0	61.3	161.0	36.8	15.0	7.8
ID 96-16702A	SWW	123.2	63.0	159.8	36.5	15.0	8.5
WB Junction (BZ6W02-616)	SWW	119.8	63.2	156.3	34.3	0.0	8.1
OR2070870	SWW	118.9	61.3	160.8	34.0	0.0	8.3
ARS 97230-6C	CLUB	117.3	62.0	161.5	35.5	10.0	6.8
OR2060323	SWW	116.2	58.7	163.0	36.5	21.3	7.6
Bruneau	SWW	115.3	60.5	162.5	37.3	28.8	8.2
Xerpha	SWW	114.8	61.6	160.8	38.3	30.0	7.2
Cara	CLUB	114.3	59.7	162.5	36.0	30.0	7.9
ORI2101839	SWW	114.3	60.8	160.8	35.3	20.0	7.9
ORCF-103	SWW	113.9	61.3	163.3	35.8	15.0	7.8
Stephens	SWW	113.5	61.3	159.0	35.8	0.0	8.1
ORI2101835	SWW	112.3	61.8	163.3	35.8	2.5	7.6
AP Legacy	SWW	110.9	61.5	160.3	36.3	25.0	7.9
ARS 98X402-1C	CLUB	110.5	61.5	161.8	35.8	23.8	7.3
OR2040726 (Mary)	SWW	109.2	62.7	158.0	35.0	5.0	8.3
ORCF-101R	SWW	108.5	61.9	159.3	36.8	21.3	7.7
ORSS-1757	SWW	108.3	61.6	160.3	37.4	27.8	8.0
Goetze	SWW	106.9	61.9	156.5	35.1	2.5	8.1
IDO 663	SWW	106.4	61.5	158.5	34.5	2.5	7.6
Skiles	SWW	105.7	63.6	160.3	34.5	0.0	7.7
ARS 970042-1C	CLUB	105.4	61.2	160.8	34.5	0.0	7.7
OR2070608	SWW	105.0	59.8	161.5	34.9	40.0	7.6
Coda	SWW	104.3	63.0	160.8	38.1	7.5	8.5
Legion	SWW	104.2	60.6	158.5	37.8	17.5	7.0
WA 8092	SWW	95.1	60.4	164.8	37.3	30.0	7.7
WB 1066CL	SWW	80.9	62.9	159.8	37.8	16.3	9.2
Mean		120.8	61.2	160.2	35.8	12.9	7.9
PLSD (0.05)		21.9	1.1	2.6	2.6	32.0	1.0
CV%		12.1	1.3	1.1	1.1	176.4	8.7

Table 4. Statewide variety testing program for spring wheat, COARC, Madras, Oregon, 2011

Variety or line	Class ¹	Yield bu/acre	Test weight (lbs/bu)	Heading (doy)	Height (in)	Lodging (%)	Protein (%)
UC 1618	HRS	135.5	58.1	182.5	32.0	0.0	10.7
IDO 599	SWS	135.2	57.8	182.7	37.3	0.0	9.1
Alturas	SWS	133.5	57.6	181.8	38.6	0.0	9.2
Lassik	HRS	132.1	57.8	182.3	33.5	0.0	10.6
IDO 671	SWS	127.4	54.8	185.3	34.0	7.5	9.7
OR4051328	HWS	126.0	54.8	185.3	34.0	5.0	9.6
Babe	SWS	122.2	56.2	182.5	39.3	12.5	9.4
IDO 687	SWS	121.8	56.9	182.0	37.5	0.0	10.2
YF-11	HRS	121.7	56.4	182.3	35.0	0.0	11.3
OR4041268	SWS	120.8	58.1	185.5	33.5	0.0	10.2
Merrill II	SWS	118.3	57.9	184.8	36.3	0.0	9.9
IDO 644	SWS	117.6	57.8	180.3	36.8	0.0	9.8
Buck Pronto	HRS	117.5	56.7	180.5	38.8	6.3	11.8
WA 8074	HRS	114.3	58.0	181.3	36.0	41.3	11.1
Alpowa	SWS	114.0	58.6	184.0	39.0	0.0	9.0
IDO 686	SWS	112.5	57.2	182.8	39.0	42.5	9.9
Malbec	HRS	111.1	57.9	180.5	31.8	0.0	10.6
Patwin	HWS	110.9	56.5	183.5	26.5	0.0	11.5
Cabernet	HRS	110.5	61.3	181.3	36.8	15.0	7.8
Bullseye	HRS	109.9	57.1	182.0	31.8	0.0	10.3
JD	Club	109.3	57.5	182.3	42.7	48.3	10.7
WA 8124	SWS	108.4	57.3	184.7	39.3	41.7	10.4
Louise	SWS	108.2	58.5	183.0	37.3	58.8	10.0
Whit	SWS	108.0	59.0	181.3	35.7	30.0	9.5
UI Cataldo	SWS	106.4	57.3	180.0	36.7	0.0	10.2
UI Winchester	HRS	105.5	56.6	182.0	34.6	3.8	11.1
UC 1617	HRS	104.3	56.4	183.0	25.0	0.0	12.2
SY Capstone	HWS	98.3	57.8	180.0	31.0	0.0	9.9
Cerere	HRS	97.8	58.9	186.0	34.7	0.0	9.6
Diva	SWS	97.6	56.9	183.8	38.0	37.5	10.7
10 Fx Inc1	HRS	96.8	57.6	181.7	35.7	0.0	10.3
Jefferson	HRS	94.1	57.7	182.5	36.5	3.8	11.6
IDO 702	HRS	89.3	58.2	181.5	36.8	12.5	11.2
Kelse	HRS	86.2	58.0	181.3	36.8	0.0	12.6
HL 550	SWS	83.2	56.3	183.0	36.3	0.0	10.2
Mean		112.0	57.4	182.4	35.5	9.9	10.4
PLSD (0.05)		11.9	2.5	1.8	2.0	24.5	1.1
CV%		7.2	2.9	0.7	3.8	167.1	7.0