

Introduction

This report summarizes the performance of winter wheat, spring wheat, spring barley, spring pea, lentil and chickpea cultivars tested in extension variety trials conducted in northern Idaho during the 2010-2011 crop season. The variety trials were located in cooperators' fields at 8 test sites in Lewis, Nez Perce, Latah, Benewah and Boundary counties.

Plant breeding and extension testing programs strive to increase yield potential through enhanced disease and insect resistance, winter hardiness, straw strength and other agronomic factors. In addition, varieties are developed for improved end-use quality and new markets. A more detailed description of variety development, cooperative extension testing and evaluation, and seed production programs is given in the University of Idaho publication CIS 976 titled, "Small Grain Variety Development and Adaptation in Idaho". Additional information about the varieties can be found in the 2005 Idaho Certified Seed Selection Guide for Some Varieties of Winter Wheat (PR 311), 2006 Spring Wheat (PR 327), 2006 Spring Barley (PR 328), and 2004 Peas, Lentils and Chickpeas (PR 318). Additional variety performance data for northern Idaho and the rest of the state can be viewed at the website <http://www.extension.uidaho.edu/cereals/>. In Idaho, public varieties are evaluated for general adaptation in regional testing programs. The northern Idaho Extension variety-testing program evaluates the relative performance of cereal and legume varieties grown in various northern Idaho environments under a range of commercial production conditions. Breeding lines that have shown promise through regional, public and private testing programs are evaluated along with leading commercially released varieties.

Increases in field crop yield are the result of a combination of improved agronomic practices and advances in variety development. Trials reported in this publication help producers compare new cultivars with widely grown cultivars using field production practices common for their area. The information provided represents crop performance results from specific locations, production practices, and environmental conditions. Relative performance of varieties can change when tested under other environments and production practices. Evaluation of any variety included in these trials should not be construed as recommending any variety over varieties not included in the trials.

Cereal Test Procedures

Six winter cereal trials were planted in northern Idaho during the fall of 2010 and seven spring cereal trials were planted in the spring of 2011. For each crop, the seeding rate for all entries was a common number of seeds planted per square foot (spsf). These rates were determined by weighing 200 seeds of each cereal cultivar. Winter wheat and spring barley were planted at 24 (spsf), and spring wheat at 28 spsf. Winter wheat, spring wheat, and barley seed were treated with Dividend Extreme at 1 ounce/100 pounds. Plots in conventional tillage systems were planted 15 feet long on 5-foot centers with 7 rows, 7-inches apart. Direct-seeded trials had five paired rows with 3-inch spacing and 10-inch from center to center of pairs. Typical cereal seeding depth varied from 1 to 1.5 inches depending on soil texture and moisture conditions. All trials were replicated four times in a lattice design. After plants were well established, the beds were cut back to a plot size of approximately 11.5 feet in length with an application of glyphosate using a tractor-mounted, shielded sprayer between plots. All trials were established and maintained primarily under "grower management" conditions. Fertilizers and pesticides used in the trials are listed in Table 1 for the

sites where the information was reported. Planting and harvesting operations by University of Idaho personnel were timed to approximately coincide with the cooperator's operations.

Each small grain entry at each location was evaluated for grain yield, test weight, plant height, and lodging. Plot length was measured to determine each individual plot area. Cereal yields were reported in bushels per acre, using the standard 60 pounds per bushel conversion for wheat and 48 pounds per bushel for barley. Protein and kernel hardness were determined from a composite sample of four replications from each site for both winter and spring wheat. Wheat whole grain protein at 12% moisture was measured at the University of Idaho Wheat Quality Laboratory at Aberdeen using Near Infrared Spectrometry (NIRS) technology. Kernel hardness was also determined by NIRS. Values under 35 indicate soft wheat, and values above 35 indicate hard wheat. Cereal test weight is reported in pounds per standard bushel. Cereal plant height is the length of the plant from the soil surface to the tip of the head (awns excluded).

Lodging was determined for all cereals. Area affected was scored from 0% to 100%, with 0% equal to no lodging and 100% being completely lodged. Percentage grain plumps and thins were measured for barley only. Plumpness is the percent of the sample that stayed on top of a 6/64-inch slotted screen after shaking. Thin percentage is the portion of the sample that went through a 5.5/64-inch slotted screen.

Legume Test Procedures

In the spring of 2011, spring pea and lentil trials were seeded near Nez Perce, Genesee and Moscow. A chickpea trial was conducted at the University of Idaho's Parker farm in Moscow. For each legume cultivar, 100 seeds were weighed and seeding rates calculated to give a planting density of pea at 8 spsf, lentil at 9 spsf, and chickpea at 6 spsf. Spring pea and lentil seed were treated with an Apron, Cruiser, and Maxim mix at 2 ounces/100 pounds; and chickpea seed was treated with Garb mix (Apron, Cruiser, Maxim and LSP) at 2.5 ounces/100 pounds. Legume plots were established in beds similar to the cereal trials except they were planted on 20-ft beds that were cut back to 15-ft plots. Planting depths used were between 1 and 2 inches for lentils and between 2 and 2.5 inches for pea and chickpea. Sites were hand weeded to supplement chemical control. Legumes were evaluated for seed yield, plant height, and 100-seed weight. Seed yields were expressed as pounds per acre. Lentil or chickpea plant heights or pea vine lengths were measured from soil surface to end of growing point on the main tiller. Pea canopy heights were measured from the soil surface to the average tall point in the canopy approximately three weeks prior to harvest.

Statistical Interpretation

Crop class averages are shown within the body of the data tables and overall trial average is shown at the bottom of the table. The least significant difference (LSD) and the coefficient of variation (CV) are listed. The LSD 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 column differ by the LSD value or greater, they may be considered different with a confidence level of 95%. If the measured values are less than the LSD value, the differences may be due to random error rather than real differences. If no significant statistical differences were found among cultivars, NS is shown for the LSD. Where data represent cultivar means across locations, an approximation of combined LSD was calculated.

Coefficient of variation (CV) is also included in the tables. This is given as a general measurement of the precision of each experiment. Lower CV percentage values indicate less experimental variation and greater precision. CV values were not averaged across trials or years. Wheat protein and hardness data are from composited samples, therefore no LSD or CV values are presented. Cultivar choice should take into consideration as much performance data as possible with comparisons across years and locations. In addition to yield, end use quality, disease and insect resistance, lodging tendency, maturity, plant height, winter hardiness, test weight, and any observations from grower experience can be used in deciding on which cultivars to plant. The Idaho Wheat Commission website also provides a list of recommended varieties: www.idahowheat.org under “Preferred Varieties”.

Growing Conditions and Factors Affecting Trials

Fall cereal trials were planted in October 2010. Winter wheat trials stands were well established at all locations. A cool, wet spring preceded by a cool, wet winter surpassed annual precipitation records at most locations in terms of total snowfall and rainfall. Melting snow and spring rain saturated soils leaving standing water negatively affected low lying fields. Erosion on steep slopes was common. However, ample snow cover protected most northern Idaho winter cereal crops from cold damage and water stress later in the season was negligible. Heavy stripe-rust occurred across the Palouse in the late summer/fall of 2010, which carried over to early-planted winter cereals in the region. With fall-infected fields and a prolonged cool wet-spring, stripe-rust became an early and persistent issue throughout the northern Idaho growing region. Temperatures needed to engage High Temperature Adult Plant Resistance (HTAP) genes to stripe-rust did not occur until late June in most areas. Compounding the effects of the stripe-rust pressure was a new stripe rust race that overcame many previously resistant lines of wheat. Multiple fungicide applications became necessary to protect cereals, but were largely effective. The average winter wheat yield over all locations in 2010-2011 was 26 bushels/acre higher than the average yield over the previous three crop years.

Spring trials were seeded between April 27 and May 19 (see Table 1). Planting was delayed due to wet soil conditions. Frequent weather systems brought cool temperatures and precipitation throughout the planting season. Where fungicide applications were timed correctly, spring wheat yields were generally well above average. Spring wheat yields in 2011 were 18 bushels/acre higher than the previous 3-year average. Spring barley yields were 25 bushels/acre higher than the previous 3-year average. Specific management practices for individual trials are listed in Table 1.

Trial Locations, Management and Varieties Tested

Table 1. 2010-2011 Northern Idaho Extension variety trial site management information.

Crop	County	Nursery Location	Planting Date	Harvest Date	Previous Crop	Fertilizer N-P-K-S(lb/A)	----Chemical----	Rates(s)
<u>Winter Cereals</u>								
Winter Wheat	Lewis	Craigmont	10/13/2010	9/14/2011	W. Wheat	120-10-0-15	BMP ²	
Winter Wheat	Nez Perce	Tammany	9/29/2010	8/5/2011	S. Fallow	120-20-0-5	Powerflex Uran Ally M-90 Tilt (two apps)	3.5 oz./A 1 gal/A 0.5 oz./A 1 qt/A 8 oz.
Winter Wheat	Nez Perce	Genesee	10/14/2010	8/16/2011	W.Wheat	160-10-0-15	BMP ²	
Winter Wheat	Latah	Moscow Parker Farm	10/13/2010	8/25/2011	S. Pea	100-10-0-15	Roundup RT Huskey Affinity Broad Puma Quilt	20 oz/A Pre 12 oz/A 0.8 oz/A 11 oz/A 7oz/A
Winter Wheat	Boundary	B. Ferry	10/12/2010	8/29/2011	S. Canola	100-10-0-15	BMP ²	
Winter Wheat	Benewa	Tenesed	10/1/2010	8/26/2011	Lentils	BMP ²	BMP ²	
Winter Barley	Boundary	B.Ferry	10/12/2010	8/29/2011	S. Canola	100-10-0-15	BMP ²	
<u>Spring Cereals</u>								
Soft Wheat	Lewis	Craigmont	5/11/2011	9/8/2011	W. Wheat	100-10-0-15	Orion Ally	17 oz./A 0.10 oz./A
Soft Wheat	Nez Perce	Genesee	4/27/2011	9/1/2011	W. Wheat	100-28-0-29	Huskie Axial XL PROPI-STAR ALTO Dimethoate Uran	13 oz./A 16.4 oz./A 4 oz./A 4 oz./A 3/4 pt. 1 gal/A
Soft Wheat	Boundary	B. Ferry	5/2/2011	9/6/2011	S. Canola	80-10-0-15	BMP ²	
Hard Wheat	Lewis	Craigmont	5/11/2011	9/8/2011	W. Wheat	160-10-0-15	Orion Ally	17 oz./A 0.10 oz./A
Hard Wheat	Nez Perce	Genesee	4/27/2011	9/1/2011	W. Wheat	160-28-0-29	Huskie Axial XL PROPI-STAR ALTO Dimethoate Uran	13 oz./A 16.4 oz./A 4 oz./A 4 oz./A 3/4 pt. 1 gal./A

2- BMP - Recommended best management practice rates of chemical application.

Table 1 (continued). 2010-2011 Northern Idaho Extension variety trial site management information

Crops	County	Nursery Location	Planting Date	Harvest Date	Previous Crop	Fertilizer N-P-K-S(lb/A)	----Chemical---- Name(s)	Rates(s)
<u>Spring Cereals</u>								
Hard Wheat	Boundary	B. Ferry	5/2/2011	9/8/2011	Canola	140-10-0-15	BMP ²	
Spring Barley	Lewis	Craigmont	5/11/2011	9/8/2011	W. Wheat	100-10-0-15	Orion	17 oz./A
							Ally	0.10 oz./A
Spring Barley	Nez Perce	Genesee	4/27/2011	9/1/2011	W. Wheat	100-28-0-29	Huskie	13 oz./A
							Axial XL	16.4 oz./A
							PROPI-STAR	4 oz./A
							ALTO	4 oz./A
							Dimethoate	3/4 pt.
							Uran	1 gal/A
Spring Barley	Latah	Moscow Parker Farm	5/19/2011	9/9/2011	W. Wheat	80-10-0-15	Roundup	20 oz/A Pre
							Huskie	13 oz./A
Spring Barley	Boundary	B. Ferry	5/2/2011	9/8/2011	S. Canola	80-10-0-15	BMP ²	
<u>Spring Legumes</u>								
Peas	Latah	Moscow Parker Farm	5/5/2011	8/17/2011	S. Barley	None	Roundup Warrior	32 oz/A Pre 3.0 oz./A
Peas	Nez Perce	Genesee	5/11/2011	9/2/2011	S. Barley	None	Roundup Dimethoate Select	16 oz/A Pre 16 Oz/A 10 oz./A
Peas	Latah	Genesee Kambitsch Farm	5/5/2011	8/22/2011	S. Barley	None	Roundup Tricor Prowl Warrior	20 oz/A Pre 1/4 lb. A 2 pt./A 2.6 oz./A
Lentils	Latah	Moscow Parker Farm	5/5/2011	8/23/2011	S. Barley	None	Roundup Tricor	32 oz/A Pre 1/4 lb./A
Lentils	Latah	Genesee Kambitsch Farm	5/5/2011	8/22/2011	S. Barley	None	Roundup Tricor Prowl Warrior	20 oz/A Pre 1/4 lb. A 2 pt./A 2.6 oz./A
Lentils	Nez Perce	Genesee	5/11/2011	9/2/2011	Barley	None	Roundup Dimethoate Select	16 oz/A Pre 16 Oz/A 10 oz./A
Chick Peas	Latah	Genesee Kambitsch Farm	5/5/2011	9/8/2011	S. Barley	None	Roundup Tricor Prowl Warrior Quadris	20 oz/A Pre 1/4 lb. A 2 pt./A 2.6 oz./A 7 oz./A

2- BMP - Recommended best management practice rates of chemical application.

Table 2. Released varieties tested in Northern Idaho Extension variety trials in 2010-2011

Variety	Experimental No.	Released	Developer(s) of variety
Soft white winter wheat			
Bitterroot	ID 92-22407A	2007	University of Idaho, USDA/ARS
Bruneau	ID 93-64901A	2009	University of Idaho, USDA/ARS
Brundage 96	ID-B-96	2001	University of Idaho, USDA/ARS
Idaho 587	IDO 587	2002	University of Idaho, USDA/ARS
IDO 655	IDO 655	2009	University of Idaho, USDA/ARS
Lambert	ID 85-153	1993	University of Idaho, USDA/ARS
Madsen	WA 7163	1988	Washington State University, USDA/ARS
ORCF-102	OR2010007	2004	Oregon State University, USDA/ARS
Simon	ID 91-34302A	2002	University of Idaho, USDA/ARS
Stephens	OR 65-116	1977	Oregon State University, USDA/ARS
Tubbs 06	OR 939526 - re-select	2006	Oregon State University, USDA/ARS
Xerpha	WA7973	2008	Washington State University, USDA/ARS
Skiles	ORH010085	2007	Oregon State University, USDA/ARS
UICF-Brundage	ID 02-859	2009	University of Idaho, USDA/ARS
UICF-Lambert	ID 99-435	2008	University of Idaho, USDA/ARS
WestBred 528	BZ 6W98-528	2004	WestBred, LLC, Bozeman, MT
AP Legacy			AgriPro
AP Badger			AgriPro
Winter club wheat			
Cara	ARS97135-9	2007	Washington State University, USDA/ARS
Chukar	WA 7855	2001	Washington State University, USDA/ARS
Hard winter wheat			
Boundary (HR)	IDO 467	1997	University of Idaho, USDA/ARS
Esparia (HR)			AllStar
Norwest 553 (HR)	ORN00B553	2007	OSU, USDA/ARS with Nickerson, UK
UI-SRG (HR)	IDO 656	2011	University of Idaho, USDA/ARS
UI-Silver	IDO658	2011	University of Idaho, USDA/ARS
UICF-Grace	IDO651	2011	University of Idaho, USDA/ARS
Winter barley			
Charles (malt)	ARS92Ab1274	2005	University of Idaho, USDA/ARS
Endeavor (malt)	ARS95Ab2299	2007	University of Idaho, USDA/ARS
Sprinter		1987	WestBred, LLC, Bozeman, MT
Sunstar Pride		1995	Sunderman Breeding
Strider		1998	Oregon State University, USDA/ARS
Soft white spring wheat			
Alturas	IDO 526	2002	University of Idaho, USDA/ARS
Babe	WA 8039	2009	Washington State University, USDA/ARS
Cataldo	IDO 642	2007	University of Idaho, USDA/ARS
Diva	WA 8090	2009	Washington State University, USDA/ARS
Eden	WA 7902	2002	Washington State University, USDA/ARS
JD	WA 8047	2009	Washington State University, USDA/ARS
Nick	BZ 698-31	2000	WestBred, LLC, Bozeman, MT
Penawawa		1985	Washington State University, USDA/ARS
Whit	WA 8008	2008	Washington State University, USDA/ARS
WB-1035CL2			WestBred, LLC, Bozeman, MT

Table 2 (cont.) Released varieties tested in Northern Idaho Extension variety trials in 2010-2011.

Variety	Experimental No.	Released	Developer(s) of variety
Hard white spring wheat			
Lolo	IDO 533	1999	University of Idaho, USDA/ARS
WB-Hartline			WestBred, LLC, Bozeman, MT
Hard red spring wheat			
Albany		2009	Limagrain Cereal Seed, LLC
Buck Pronto		2001	Limagrain Cereal Seed, LLC
Cerere			Richard Cooley
AP-Bullseye	BO2-0081	2009	AgriPro
Cabernet			Resource Seeds
Hank	BZ 992-322	1999	WestBred, LLC, Bozeman, MT
Jedd		2002	WestBred, LLC, Bozeman, MT
Jefferson	IDO 462	1998	University of Idaho, USDA/ARS
Jerome	IDO 566	2004	University of Idaho, USDA/ARS
Kelse	WA 7954	2009	Washington State University, USDA/ARS
WB Fuzion	BZ901-717	2008	WestBred, LLC, Bozeman, MT
UI-Winchester		2009	University of Idaho, USDA/ARS
Espresso		2007	WestBred, LLC, Bozeman, MT
Two-row spring barley			
Baronesse (feed)	NS 078054	1992	WestBred, LLC, Bozeman, MT
Bob (feed)		2002	WSU/UI/OSU-USDA/ARS
Camas (feed)	ND 9147	1998	University of Idaho, USDA/ARS
Champion (feed)	YU-501-385D		WestBred, LLC, Bozeman, MT
Conrad (feed)	B5057	2005	Busch Ag. Resources, Inc.
Spaulding (feed)	PB1-95-2R-522	2005	Plant Breeders 1, Moscow, ID
Harrington (malt)	TR-441	1981	University of Saskatchewan, Canada
Lenetah (feed)	01Ab11107	2007	University of Idaho, USDA/ARS
Merit (malt)		2000	Busch Ag. Resources, Inc.
AC Metcalfe (malt)	TR-232	1994	Ag. Canada
Radiant (malt)	98NZ223		Washington State University, USDA/ARS
CDC-Copeland (malt)		1999	University of Saskatchewan, Canada
Salute (food)		2007	WestBred, LLC, Bozeman, MT
Six-row spring barley			
Tradition (malt)	6B95-2482	2003	Busch Ag. Resources, Inc.
Aquila (feed)		2003	Utah State University, USDA/ARS
Lentils			
Brewer		1984	Washington State University, USDA/ARS
Cedar	LC00600917RZ		Washington State University, USDA/ARS
Crimson		1990	Washington State University, USDA/ARS
Eston		1980	University of Saskatchewan, Canada
Essex		2010	Washington State University, USDA/ARS
Merrit	LC 460266B	2001	Washington State University, USDA/ARS
Pardina			Spain
Morena	LC02601144P	2011	Washington State University, USDA/ARS
Richlea			Ag. Canada
Riveland			Washington State University, USDA/ARS
Shasta	LC7601114YZ	2008	Washington State University, USDA/ARS

Table 2 (cont.) Released varieties tested in Northern Idaho Extension variety trials in 2010-2011.

Variety	Experimental No.	Released	Developer(s) of variety
Yellow peas			
Carousel	SW 995848	2004	ProGene
Universal		2000	Svalof Weibull
Green peas			
Aragorn		2007	ProGene
Ariel	NZ 4L25	2001	Crop and Food Research, New Zealand
Banner	Pro 031-7053	2007	ProGene
Columbian			Campbell Soup Co.
Medora	PS 99102238	2006	Washington State University, USDA/ARS
Pacifica	Pro 011-7107	2003	ProGene
Stirling	PS 610152	2002	Washington State University, USDA/ARS
Kabuli chickpeas			
Dwelley		1994	Washington State University, USDA/ARS
Dylan	CA 9990I604C	2005	Washington State University, USDA/ARS
Sierra	CA 9783152C	2001	Washington State University, USDA/ARS
Spanish White			Spain
Troy	CA 99901875W	2007	Washington State University, USDA/ARS
Billy Beans		2010	PNW COOP
Saywer	CA0090B347C	2010	Washington State University, USDA/ARS