

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 2009-2010 crop season. The variety trials were located in cooperators' fields at 11 test sites in Idaho, Lewis, Nez Perce, Latah 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.ag.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 were 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

Five winter cereal trials were established in northern Idaho during the fall of 2009 and seven spring cereal trials were seeded in the spring of 2010. For each crop, the seeding rate for all entries was a common number of seeds planted per square foot. These rates were determined by weighing 200 seeds of each cereal cultivar. Winter wheat and spring barley were planted at 24 seeds per square foot; spring wheat at 28 seeds. Winter and spring wheat seed was treated with Dividend Extreme at 1 ounce/100 pounds; spring barley seed was treated with Raxil-Thiram at 4 ounces/100 pounds. Plots were planted 15 feet long on 5-foot centers with 7 rows, 7-inches apart, except for trials with direct seeding. 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, plots were cut back to approximately 11.5 feet in length by application of glyphosate using a tractor-mounted, shielded sprayer. 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. Lengths were measured on all plots after trimming to determine individual plot area. Cereal seed yields were reported in bushels per acre, using the standard 60 pounds per bushel conversion for wheat and 48 pounds per bushel for barley. Winter and spring wheat protein and kernel hardness were determined on samples that were composited from the four replications at each site. 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 50 indicate soft wheat, and values above 50 indicate hard wheat. Cereal test weight is reported in pounds per standard bushel. Cereal plant height is inches from the soil surface to the tip of the heads, awns excluded.

Lodging was determined for all cereals. Area affected was scored from 1 to 100, with 1 equal to no lodging and 100 being completely lodged. Severity of lodging was scored from 1 to 5, with 1 equal to upright and 5 being bent flat. The product of the two scores was adjusted to a scale of 0 to 100 to reflect percent lodging. 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 2010, 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 seeds, lentil at 9 seeds, and chickpea at 6 seeds per square foot. 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 dimensions and manner similar to the cereal trials except that the legume plots were planted at 20-ft lengths and cut back to 15-ft. Planting depths were 1 to 2 inches for lentil and 2 to 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 or years, an approximation of a 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. No LSD or CV is presented for wheat protein or hardness data from composited samples.

When making cultivar choices, try to evaluate as much performance data as possible. Make comparisons across years and locations. In addition to yield, also consider other characteristics, such as end use quality, disease and insect resistance, lodging tendency, maturity, plant height, winter hardiness, test weight, and any others you deem important. Grain quality of wheat varieties is listed on the Idaho Wheat Commission website: www.idahowheat.org under “Preferred Varieties”.

Growing Conditions and Factors Affecting Trials

Fall cereal trials were seeded during October 2009. Winter wheat trials established well at all locations but a late November cold snap affected exposed wheat at higher elevations. Late winter and early spring were warmer than is typical, encouraging vigorous cereal growth as summer began. Heavy stripe rust occurred across the Palouse in early summer, including a new stripe rust race that overcame some previously resistant lines of wheat. Stripe rust problems were compounded by cool early-summer conditions that prevented high-temperature-adult-plant-resistance (HTAP) genes in certain varieties to activate. The average winter wheat yield over all locations in 2009-2010 was 15 bushels/acre higher than the average yield over the previous three crop years.

Spring trials were seeded between April 19 and May 14 (see Table 1). Early planting was possible at lower elevations due to dry soil conditions. Heavy rains arrived toward the end of the planting season, mobilizing certain post-plant, pre-emergent herbicides into the root-zone and creating a sprouting environment with excessive soil-moisture for many acres of legumes. The spring wheat and spring barley yields were generally well above average. Spring wheat yields in 2010 were 15 bushels/acre higher than the previous 3-year average, and spring barley was 27 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. 2009-2010 Northern Idaho Extension variety trial site management information.

County	Nursery Location	Crops ¹	Planting Date	Harvest Date	Previous Crop	Fertilizer N-P-K-S(lb/A)	----Chemical---- Name(s)	Rates(s)
Lewis	Craigmont	SW & SB	4/20/2010	8/27/2010	W. Wheat	100-28-0-29	Orion MCPA Ester	17 oz./A 10 oz./A
Lewis	Craigmont	SP & SL-DS	5/14/2010	9/27/2010	W. Wheat	None	BMP ²	
Lewis	Craigmont	WW	10/8/2009	8/27/2010	W. Wheat	BMP ²	BMP ²	
Nez Perce	Tammany	WW	10/5/2009	7/29/2010	S. Fallow	110-15-0-12	Powerflex Affinity Broad Sp. Brox M AMS	3.5 oz./A 0.8 oz./A 1 pt./A 12 lb./100gal
Nez Perce	Genesee	SW & SB	4/19/2010	8/20/2010	W. Wheat	139-28-0-29	Huskie Axial TBC	11 oz./A
Nez Perce	Genesee	WW	10/5/2009	8/5/2010	W. Wheat	BMP ²	BMP ²	
Latah	Moscow	SP & SL	4/26/2010	8/10/2010	S. Barley	None	Warrior	3.5 oz./A
Latah	Moscow Parker Farm	WW-DS	10/7/2009	8/19/2010	S. Pea	139-28-0-29	Roundup RT Huskey Affinity BroadSpec	20 oz/A Pre 11 oz/A 0.5 oz/A
Latah	Moscow Parker Farm	SP&SL-DS	5/10/2009	8/18/2010	S. Barley	None	Roundup Metribuzin	32 oz/A Pre 6 oz/A
Latah	Moscow Parker Farm	CP	5/10/2010	9/28/2010	S. Barley	None	Roundup	20 oz/A Pre
Latah	Moscow Parker Farm	SB-DS	5/10/2010	8/25/2010	W. Wheat	139-28-0-29	Roundup	20 oz/A Pre

1- CP-Chickpea, SP- Spring Pea, SL-Spring Lentil, SW-Spring Wheat, SB-Spring Barley, WW-Winter Wheat, DS-Direct Seed.

2- BMP - Recommended best management practice rates of chemical application assumed. Cooperator survey not received at time of publication.

Table 1 (continued). 2009-2010 Northern Idaho Extension variety trial site management information:

County	Nursery Location	Crops ¹	Planting Date	Harvest Date	Previous Crop	Fertilizer N-P-K-S(lb/A)	----Chemical---- Name(s)	Rates(s)
Latah	Genesee	SP-DS	5/5/2010	8/24/2010		None	Roundup Dimethoate Warrior	16 oz/A Pre 3/4 pt/A 1 1/2 oz./A
Latah	Genesee	SL-DS	5/10/2010	8/24/2010		None	Roundup Dimethoate Warrior	16 oz/A Pre 3/4 pt/A 1 1/2 oz./A
Boundary	B. Ferry	WW	10/11/209	9/14/2010		BMP ²	BMP ²	
Boundary	B. Ferry	SW + SB	4/15/2010	9/14/2010		BMP ²	BMP ²	

1- CP-Chickpea, SP- Spring Pea, SL-Spring Lentil, SW-Spring Wheat, SB-Spring Barley, WW-Winter Wheat, DS-Direct Seed.

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Table 2. Released varieties tested in Northern Idaho Extension variety trials in 2009-2010

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
IDO 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-101	OR2010051	2002	Oregon State University, USDA/ARS
ORCF-102	OR2010007	2004	Oregon State University, USDA/ARS
ORCF-103	ORI2042037	2008	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
WB 528	BZ 6W98-528	2004	WestBred, LLC, Bozeman, MT
AP Legacy	ORF2BC9800267-0	2009	Syngenta Cereals
AP Badger	Rem Pop 80-3	2010	Syngenta Cereals
Winter club wheat			
Cara	ARS97135-9	2007	Washington State University, USDA/ARS
Chukar	WA 7855	2001	Washington State University, USDA/ARS
Coda	WA 7752	1998	Washington State University, USDA/ARS
Hard winter wheat			
Boundary (HR)	IDO 467	1997	University of Idaho, USDA/ARS
Bauermeister (HR)	WA 7939	2005	Washington State University, USDA/ARS
Esperia (HR)			AllStar. Inc.
MDM (HW)	WA 7936	2005	Washington State University, USDA/ARS
Norwest 553 (HR)	ORN00B553	2007	OSU, USDA/ARS with Nickerson, UK
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
Hard white spring wheat			
Lolo	IDO 533	1999	University of Idaho, USDA/ARS
WB-Hartline	BZ 903-445 WP	2010	WestBred/Monsanto

Table 2 (cont.) Released varieties tested in Northern Idaho Extension variety trials in 2009-2010.

Variety	Experimental No.	Released	Developer(s) of variety
Hard red spring wheat			
Cabernet		2007	Syngenta Cereals
Hank	BZ 992-322	1999	WestBred, LLC/Monsanto
Jedd		2002	WestBred, LLC/Monsanto
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	2010	WestBred, LLC/Monsanto
UI Winchester	IDO 578	2009	University of Idaho, USDA/ARS
Two-row spring barley			
Baronesse	NS 078054	1992	WestBred, LLC/Monsanto
Bob	WA 8682-96		
Camas	ND 9147	1998	University of Idaho, USDA/ARS
Champion	YU-501-385D		WestBred, LLC/Monsanto
Conrad	B5057	2005	Busch Ag. Resources, Inc.
Harrington	TR-441	1981	University of Saskatchewan, Canada
Lenetah	01Ab11107	2007	University of Idaho, USDA/ARS
Merit	2B91-4947	2000	Busch Ag. Resources, Inc.
AC Metcalfe	TR-232	1994	Ag. Canada
Radiant	98NZ223	2003	Washington State University, USDA/ARS
Spaulding	PB1-95-2R-522	2005*	Plant Breeders 1, Moscow, ID
Tetonia	99Ab11720	2007	University of Idaho, USDA/ARS
Two-row hulless spring barley			
Clearwater	01AB435H	2006	University of Idaho, USDA/ARS
Salute		2007	WestBred, LLC/Monsanto
Six-row spring barley			
Tradition	6B95-2482	2003	Busch Ag. Resources, Inc.
Lentil			
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
Merrit	LC 460266B	2001	Washington State University, USDA/ARS
Pardina			Spain
Richlea			Ag. Canada
Riveland			Washington State University, USDA/ARS
Shasta	LC7601114YZ	2008	Washington State University, USDA/ARS

* certified

Table 2 (cont.) Released varieties tested in Northern Idaho Extension variety trials in 2009-2010.

Variety	Experimental No.	Released	Developer(s) of variety
Yellow pea			
Carousel	SW 995848	2004	ProGene
Delta			Cebeco, Netherlands
Rex		1993	Crop and Food Research, New Zealand
Shawnee	PS 010603	1997	Washington State University, USDA/ARS
Universal		2000	Svalof Weibull
Green pea			
Aragorn			ProGene
Ariel	NZ 4L25	2001	Crop and Food Research, New Zealand
Banner	Pro 031-7053	2007	ProGene
Columbian			Campbell Soup Co.
Cruiser	NZ 4L28	2001	Crop and Food Research, New Zealand
Joel	PS 110028	1997	Washington State University, USDA/ARS
Karita		1995	Svalof Weibull
Medora	PS 99102238	2006	Washington State University, USDA/ARS
Monarch	Pro 98106	2003	ProGene
Pacifica	Pro 011-7107	2003	ProGene
Stirling	PS 610152	2002	Washington State University, USDA/ARS
Kabuli chickpea			
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
Desi chickpea			
Myles		1994	Washington State University, USDA/ARS