

PROJECT NO: BJKV34, BJKV35, BJKV36

TITLE: Extension Wheat Nurseries

PERSONNEL: Dr. Juliet Marshall, Ext. Crop Mgmt. Specialist (SC and E Idaho)
Dr. Kurtis Schroeder, Moscow, Ext. Crop Mgmt. Specialist (N Idaho)
Parma, Ext. Crop Mgmt. *Incoming Specialist* (SW Idaho)

ADDRESS: Dr. Juliet Marshall, 1776 Science Center Dr, Ste 205, Idaho Falls, ID, 83402;
208-529-8376; jmarshall@uidaho.edu

JUSTIFICATION: Idaho wheat producers need the most recent information and technology to improve production efficiency, increase economic returns, and maintain their competitiveness. Cooperative Extension programs enhance technology transfer to growers and industry personnel through cereal schools, published materials, websites, webinars, cereal nurseries, demonstrations and field tours.

Idaho has extremely diverse growing conditions for wheat. Few varieties are widely adapted to all environments. Appropriate variety selection is critical for maximizing grower financial returns. Extension Wheat Nurseries provide an objective, uniform, and statistically sound evaluation of winter and spring wheat varieties and advanced lines (candidates for release) in diverse Idaho environments. Public varieties, especially from Idaho, Oregon, Washington, and Utah, as well as selected private entries are evaluated. The testing program is statewide in scope. Since it is also not feasible to locate wheat breeder nurseries in all geographic areas of Idaho, Extension nurseries provide added performance information critical for the release of varieties for specific areas and management systems.

In addition to providing much needed performance data for the wheat entries, the Extension Wheat Nurseries, which are located mostly in grower fields, serve as excellent demonstration tools for the transfer of wheat technology to growers and agribusiness personnel. Exposure to new varieties and/or advanced lines, and in some cases market classes, can increase the rate at which the new alternatives are evaluated or adopted by the producer. The nurseries also provide increased exposure of the programs and activities of the Idaho Wheat Commission and Idaho Grain Producers Association.

HYPOTHESIS & OBJECTIVES: The hypothesis is that the relative performance of varieties, new releases, and advanced lines differ in the diverse environments in the state. The specific objectives are

- To evaluate the agronomic performance of current varieties, advanced lines, and classes of winter and spring wheat at diverse locations in Idaho.
- To hasten the adoption of improved varieties by increasing their exposure to Extension workers, growers, and agribusiness personnel.
- To inform producers and supporting agribusinesses of new cereal technology.
- To support local county wheat extension programs.

PROCEDURES:**Extension Wheat Nurseries**

The Extension Wheat Nurseries are coordinated through the leadership of the Extension Cereal Specialists. County Extension Educators are the local coordinators of the trials. Thirteen winter nurseries were planted and 9 spring nurseries are planned for the 2014 season. There is 1 Parma winter nursery (planted in conjunction with Oregon State University Agronomist Mike Flowers), 6 winter nurseries (3 irrigated, 3 dryland) and 5 spring nurseries planned (4 irrigated, 1 dryland) in SE Idaho, 6 winter (all dryland or rainfed) and 4 spring nurseries planned (all dryland) in north Idaho. Whereas most trials are conventionally planted, three nurseries (three in northern Idaho and one in SE Idaho) are direct seeded. The winter and spring nurseries typically include soft white, hard red, and hard white wheat classes and at times durum. The nurseries emphasize the evaluation of new varieties or advanced lines (with excellent potential for release) for which local performance data is lacking. Nursery entries are evaluated for stand establishment, winter survival, disease and insect pests, yield, test weight, protein, plant height, and lodging. Similar procedures are used in all nurseries. The entries are randomized and replicated (three or four times) in a randomized complete block design to provide for objective evaluations and statistical analysis.

Wheat quality is a concern and wheat samples harvested from the Extension Wheat nurseries are submitted to the Wheat Quality Lab in Aberdeen, directed by Katherine O'Brien, for milling and baking tests and the wheat quality information compiled with the agronomic information. The information is critical to breeders and the industry for determination of advanced line performance in diverse Idaho environments.

Field Tours

Field tours are conducted at several Extension Wheat Nurseries or variety strip demonstrations to provide growers and industry personnel the opportunity for viewing the varieties and their differences in agronomic characteristics. The tours are used to present results from previous nurseries, as well as other pertinent wheat research. The information shared invariably goes beyond the question of variety selection. Marketing, pest control (weeds, insects, and diseases), water management, fertilization practices and other topics may be covered as well. Specific concerns of producers are also addressed. Maximum use of the nurseries by County Extension and industry personnel is encouraged. Producers or fieldmen visit the nurseries at times other than the scheduled tour.

DURATION: Continuous

COOPERATION: Aberdeen Wheat Quality Laboratory: Katherine O'Brien, Director
County Extension Educators, public and private breeders, and grower cooperators.

ANTICIPATED BENEFITS/EXPECTED OUTCOMES/INFORMATION TRANSFER:

Idaho wheat producers will receive the most recent wheat variety performance information to improve production efficiency, increase economic returns, and maintain their competitiveness. Information on variety performance is shared with growers and industry personnel through cereal schools, published materials, wheat nurseries, demonstrations, field tours and the Internet.

LITERATURE REVIEW: None

COMMODITY COMMISSION BUDGET FORM

Allocated by	Idaho Wheat Commission	during FY 2013	\$ 29,090
Allocated by	Idaho Wheat Commission	during FY 2014	\$ 31,114

REQUESTED FY 2015 SUPPORT:

	Salary	Temporary Help	Fringe	Travel	OE	CO	Grad Fees	TOTALS
Idaho Wheat Commission	\$ -	\$ 12,588	\$ 7,309	\$ 5,900	\$ 5,640	\$ -	\$ -	\$ 31,437

OTHER RESOURCES (not considered cost sharing or match):

a) Industry	\$ 28,250
b) UI (salaries, operating)	\$ 62,000
c) Other (local, state)	\$ -
d)	\$ -
e)	\$ -
TOTAL OTHER RESOURCES	\$ 90,250

TOTAL PROJECT ESTIMATE FOR FY 2015:	\$ 31,437 (Requested)	\$ 90,250 (Other)	\$ 121,687 (Total)
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BREAKDOWN FOR MULTIPLE SUB-BUDGETS:

	Marshall	Schroeder	Parma	(PI name)
Salary	\$ -	\$ -	\$ -	\$ -
Temporary Help	\$ 7,300	\$ 3,000	\$ 2,288	\$ -
Fringe Benefits	\$ 4,891	\$ 885	\$ 1,533	\$ -
Travel	\$ 3,000	\$ 2,800	\$ 100	\$ -
Operating Expenses	\$ 2,990	\$ 2,000	\$ 650	\$ -
Capital Outlay	\$ -	\$ -	\$ -	\$ -
Graduate Student Fees	\$ -	\$ -	\$ -	\$ -
TOTALS	\$ 18,181	\$ 8,685	\$ 4,571	\$ -
			Total Sub-budgets	\$ 31,437

CURRENT AND PENDING SUPPORT Form:

Name: Juliet Marshall

NAME (List PI/PD #1 first)	SUPPORTING AGENCY AND AGENCY NUMBER	TOTAL \$ AMOUNT	EFFECTIVE AND EXPIRATION DATES	% OF TIME COMMITT- ED	TITLE OF PROJECT
	Current:				
Marshall, J.M., and Johnson (Schroeder)	Idaho Wheat Commission	\$29,090	7/1/13 - 6/30/14	10	Extension Wheat Nurseries
Marshall, J.M. and Johnson (Scroeder)	Idaho Barley Commission	\$13,000	7/1/13 - 6/30/14	8	Education for Barley Production / Extension Nurseries
Marshall, J.M. and Patterson, P.	Idaho Wheat Commission	\$9,746	7/1/13 - 6/30/14	7	Production Systems and Wheat Varieties for Dryland Grain
Marshall, J.M.	USDA-ARS SCA	\$9,000	10/1/13 - 9/31/14	10	Management of Wheat and Barley Root Pathogens in Idaho
Marshall, J.M.	Monsanto, Syngenta, Limagrain, etc	\$28,250	7/1/13 - 6/30/14	2	Private breeding company entries into the Extension Variety Trials
Marshall, J.M.	Bayer Crop Sciences, BASF, Syngenta, etc	\$53,092	8/1/13- 7/31/14	8	Seed Treatment / Specialty Trials / Product Evaluation
Marshall, J.M.	Federal 047	\$1800		1	South Idaho Crop Management
Marshall, J.M.	Idaho State Funding	\$17,847	7/1/13 - 6/30/14	10	Barley Enhancement
Marshall, J.M.	Hatch Funding	\$1118	10/1/13 - 9/31/14	10	Foot Rot
Rashed, A. and Marshall, J.M.	Idaho Wheat Commission	\$7,800	7/1/13 - 6/30/14	2	Variety Screening for BYDV Resistance in Idaho

Marshall, J.M. and Schroeder, K.	Idaho Wheat Commission	\$9,000	7/1/13 – 6/30/14	5	Collaborative Nitrogen by Variety Interaction Study with LCS
Marshall, J.M. and Schroeder, J.	Idaho Wheat Commission	\$14,000	7/1/13 – 6/30/14	5	Biostimulant Efficacy Field Trial
Moore, A., and Marshall, J.M.	Idaho Barley Commission	\$16,000 (SA \$547)	2013-2014	1	Long-Term Impacts of Manure Application on Production of Barley and Other Crops
Moore, A. and Marshall, J.M.	Iaho Wheat Commission	\$18,210 (SA \$547)	2013-2014	1	Long-Term Impacts of Manure Application on Production of Wheat and Other Crops
Chen J., Wang, Y., and Marshall, J.M.	Idaho Wheat Commission	\$44,973 (SA \$7462.35)	7/1/13 – 6/30/14	2	Digging the genetic factors underlying LMA in wheat
Murray, T., Carter, A., and Marshall, J.M.	Idaho Wheat Commission	\$52,980 (SA \$4000)	7/1/13 – 6/30/14	1	Enhancing Resistance to Snow Mold Diseases in Winter Wheat
Marshall, J.M.	Iaho Wheat Commission	\$12,888	7/1/13- 6/30/15	1	Endowment funding
	Pending:				
Marshall, J.M., and Schroeder, K.,	Idaho Wheat Commission	\$31,437	7/1/14 - 6/30/15	10	Extension Wheat Nurseries
Marshall, J.M. and Scroeder, K.	Idaho Barley Commission	\$14,672	7/1/14 - 6/30/15	8	Education for Barley Production / Extension Nurseries
Marshall, J.M. and Patterson, P.	Idaho Wheat Commission	\$9,746	7/1/14 - 6/30/15	7	Production Systems and Wheat Varieties for Dryland Grain

Marshall, J.M.	USDA-ARS SCA	\$6,042	10/1/14 - 9/31/15	10	Management of Wheat and Barley Root Pathogens in Idaho
Rashed, Marshall, Bosque-Perez, Pappu, Wallis, Eigenbrode	Idaho Wheat Commission	\$19,069	7/1/14 - 6/30/15	2	Wheat variety response to BYDV infection at different developmental stages
Rashed, A and Marshall, J.M.	Idaho Wheat Commission	\$36,400	7/1/14 - 6/30/15	2	A survey of central and eastern Idaho wireworm species and evaluating ecological and chemical approaches to maximize cereal production
Rashed, A and Marshall, J.M.	Idaho Barley Commission	\$15,540	7/1/14 - 6/30/15	2	A survey of central and eastern Idaho wireworm species and evaluating combinations of ecological and chemical approaches to limit damage to barley crops
Marshall, J.M. and Schroeder, K.	Idaho Wheat Commission	\$9,000	7/1/14 – 6/30/15	5	Collaborative Nitrogen by Variety Interaction Study with LCS
Marshall, J.M. and Schroeder, K.	Idaho Wheat Commission	\$14,000	7/1/14 – 6/30/15	5	Biostimulant Efficacy Field Trial
Moore, A. and Marshall, J.M.	Idaho Wheat Commission	\$19,110 (SA \$547)	2014-2015	5	Long-Term Impacts of Manure Application on Production of Wheat and Other Crops
Moore, A. and Marshall, J.M.	Idaho Barley Commission	\$16,000 (SA \$547)	2014-2015	5	Long-Term Impacts of Manure Application on Production of Barley and Other Crops

Rashed, Marshall, Bosque-Perez, Pappu, Wallis, Eigenbrode	Idaho Wheat Commission	\$19,069	2014-2016	3	Wheat variety response to BYDV infection at different developmental stages
Strawn, D., Chen, J., McDaniel, P., and Marshall, J.M.	Idaho Wheat Commission	\$73,907	7/1/14-6/30/15	2	Field-based study of factors affecting cadmium uptake by wheat from Idaho Soils
Chen, J., Wang, Y., and Marshall, J.M.	Idaho Wheat Commission	\$64,205	7/1/14 – 6/30/15	2	Digging the genetic factors underlying LMA in wheat

CURRENT AND PENDING SUPPORT Form:

Name: Kurtis Schroeder

NAME (List PI/PD #1 First)	SUPPORTING AGENCY AND AGENCY NUMBER	TOTAL \$ AMOUNT	EFFECTIVE AND EXPIRATION DATES	% OF TIME COMMITTED	TITLE OF PROJECT
Schroeder, K.	Current: U.S. Dry Pea and Lentil Council	\$18,338	7/1/13-12/31/14	2%	Pea, Lentil and Chickpea Extension Variety Trials in Northern Idaho
Schroeder, K.	Idaho Barley Commission	\$5,040	7/1/13-6/30/14	2%	Support Scientist Funding
Marshall, J. and Schroeder, K.	Idaho Barley Commission	\$14,672	7/1/13-6/30/14	2%	Education for Idaho Barley Production: Extension Cereal Nurseries
Schroeder, K.	Idaho Wheat Commission	\$9,800	7/1/13-6/30/14	2%	Support Scientist funding
Marshall, J. and Schroeder, K.	Idaho Wheat Commission	\$31,114	7/1/13-6/30/14	2%	Extension Wheat Nurseries
Marshall, J. and Schroeder, K.	Idaho Wheat Commission	\$14,000	7/1/13-6/30/14	2%	Biostimulant Efficacy Field Trial

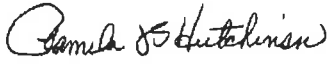
Marshall, J. and Schroeder, K.	Idaho Wheat Commission	\$9,000	7/1/13-6/30/14	2%	Collaborative Nitrogen x Variety Interaction Study with LCS
Schroeder, K.	Pending: U.S. Dry Pea and Lentil Council	\$19,532	7/1/14-12/31/15	2%	Pea, Lentil and Chickpea Extension Variety Trials in Northern Idaho
Schroeder, K.	Idaho Barley Commission	\$5,040	7/1/14-6/30/15	2%	Support Scientist Funding
Marshall, J. and Schroeder, K.	Idaho Barley Commission	\$14,672	7/1/14-6/30/15	2%	Education for Idaho Barley Production: Extension Cereal Nurseries
Schroeder, K. and Hu, G.	Idaho Barley Commission	\$4,025	7/1/14-6/30/15	2%	Evaluation of Advanced Barley Lines in Northern Idaho
Schroeder, K.	Idaho Wheat Commission	\$9,800	7/1/14-6/30/15	2%	Support Scientist funding
Marshall, J. and Schroeder, K.	Idaho Wheat Commission	\$31,437	7/1/14-6/30/15	2%	Extension Wheat Nurseries
Schroeder, K. and Painter, K.	Idaho Wheat Commission	\$20,288	7/1/14-6/30/15	2%	Managing Soil Acidity and Aluminum Toxicity in Northern Idaho
Marshall, J.M. and Schroeder, K.	Idaho Wheat Commission	\$9,000	7/1/14-6/30/15	2%	Tailoring nitrogen recommendations by variety: winter wheat response to fertilizer application timings
Marshall, J.M. and Schroeder, K.	Idaho Wheat Commission	\$14,000	7/1/14-6/30/15	2%	Biostimulant Efficacy Field Trials

INTERNAL PEER REVIEW/PRINCIPAL INVESTIGATOR VERIFICATION FORM

INTERNAL PEER REVIEW VERIFICATION

Commodity commissions/organizations require internal peer review by colleagues familiar with the subject matter.
This proposal has been peer reviewed by the following individuals:

Reviewer 1: Dr. Phillip Wharton  1/2/14
(Type/Print name) (Signature) (Date)

Reviewer 2: Dr. Pamela J.S. Hutchinson  1/2/14
(Type/Print name) (Signature) (Date)

Dept. Head/ Dr. Paul McDaniel  1/6/14
Unit Administrator (Type/Print name) (Signature) (Date)

PROGRESS REPORT

PROJECT NO: BJKV34, BJKV35, BJKWV36

TITLE: Education for Idaho Wheat Production: Extension Wheat Nurseries and Demonstrations

PERSONNEL: Dr. Juliet M. Marshall, Ext. Cropping Systems Mgmt Specialist, Aberdeen
Dr. Brad Brown, Ext. Soil and Crop Mgmt Specialist, Parma (retired)
Dr. Kurtis Schroeder, Ext. Cropping Systems Mgmt Specialist, Moscow
Doug Finkelnburg, Research Support Scientist, Moscow

ADDRESS: Dr. Juliet M. Marshall, 1776 Science Center Drive, Suite 205, Idaho Falls, ID 83210. 208-397-4181; jmarshall@uidaho.edu

ACCOMPLISHMENTS: Replicated wheat trials were conducted at thirteen winter and nine spring locations for harvest in 2013. All trials were located on grower fields except those at Parma, Moscow, Kimberly and Aberdeen, which were located on University of Idaho Research and Extension Centers. Trials on producer's fields received the same management as did the surrounding field area. Four winter and five spring trials were irrigated and eight winter and five spring trials were rainfed or dryland. Numbers of entries, average yield, and yield range are given in Table 1. At selected locations data were collected for winter survival, heading date, plant height, and lodging. Grain yield, test weight and agronomic data from all sites were determined and samples were taken for laboratory evaluation of grain protein, kernel hardness and milling and baking quality. In addition to the more common market classes, durum varieties were included at some locations.

Milling and baking of harvest subsamples are being processed. Available agronomic data have been sent to cooperating breeders and county extension offices, and are available on University websites. Data are being prepared for presentation at other venues to insure the information is provided to as wide an audience as possible. Winter results were distributed last fall to various popular press outlets and will be for spring trial results. Refer to the publications below for a complete listing. In addition to the winter reports, oral presentations are given at cereal schools and other grower meetings.

Field tours were held at many sites in collaboration with county extension educators and these provided excellent opportunities for technology transfer on many cereal related topics. Trial sites were located as much as possible on roadways where large signs could acknowledge the support from the Idaho Wheat Commission. Cereal schools, coordinated by specialists, county educators and industry, were held at several locations throughout the state and afforded an opportunity to present the variety information as well as other related cereal management and marketing information.

Environmental conditions were highly varied throughout the state. In northern Idaho stripe rust pressure was low, while in western, southern and eastern Idaho stripe rust affected only susceptible spring wheats. Barley yellow dwarf was also a problem in winter wheat. In southern Idaho, while planting did not occur early, the earliest planted winter wheat and barley were affected by aphids transmitting BYDV, likely migrating from late season corn. In northern Idaho, the timing of planting was average but BYD also occurred in many locations. The PAV strain was identified by Alex Karasev as the predominant strain of the virus. In southeast Idaho, there was significant wireworm and wheat stem sawfly damage in many dryland and irrigated production areas. Army worm caused late season damage in the Soda Springs and American Falls areas. Drought conditions prevailed through the spring and summer. The fall of 2013 was warm and dry.

Winter wheat performance information for 2013: No one variety was dominant across the state as expected given the diversity of Idaho production systems and environments, and due to limited inclusion at all locations. In northern Idaho, the highest yielding soft white wheats were LCS-Artdeco, Bobtail (OR08047P94), SY-Ovation, Bruneau and Rosalyn (OR2071071) (113, 112, 112, 111 and 109 bu/A, respectively). An advanced line being developed by the University of Idaho was also among the top yielding varieties. Test weights were slightly below average to average, and overall yield for the trials were 103 bu/A. The highest yielding hard wheats were LCS-Colonia, WB-Keldin, LCS-Azimut and Genesis (124, 116, 114 and 113, respectively). Advanced lines being developed by LCS and Oregon State University were also top yielders. The above average yields excluded Boundary County since elk grazing over the winter substantially increased variability within the nurseries.

In SW Idaho, one irrigated winter trial and one irrigated spring wheat trial was planted. Of the named varieties, the hard winter wheat, Keldin, Azimut, Genesis, Skiles and WB-Arrowhead yielded 154, 149, 149, 147, and 143 bu/A, respectively, and some of the advanced, numbered lines yielded higher. The soft white winter wheats AP Badger, Rosalyn, Mary, SY 107 and WB-456 yielded 173, 171, 166, 165 and 165 bu/A, respectively.

In SC and SE Idaho, Bobtail, Bruneau, UICF Brundage, LCS Artdeco, Skiles and WB528 (125, 121, 116, 115, 113, and 113 bu/A, respectively) were soft whites among the highest yielding group in the three irrigated sites, and Bitterroot, Eltan, Bruneau, and Madsen performed the best in the varieties under very poor dryland production conditions. Among hard wheats, entries Keldin (127 bu/A), Norwest 553 (125 bu/A), Yellowstone (122 bu/A), Utah 100 (120 bu/A), and WB-Arrowhead (119 bu/A) were in the highest yield group averaged over the irrigated sites. UICF Grace, UI SRG, Utah 100, Keldin, WB-Arrowhead, Lucin-CL, Curlew, and Yellowstone were the highest yielding hard wheats under Ririe and Rockland dryland conditions.

Spring wheat performance information for 2013: For the soft white spring locations in northern Idaho, WB-6341, Diva, Whit, WB-6121 and UI-Stone were the highest yielding varieties (87,83,81,80 and 79 bu/A, respectively) along with a couple of advanced lines out of the Washington State University program. In SC and SE Idaho, two experimental lines (IDO861 and WB-exp-125), and UI Stone (IDO599) were in the high yield group. In the Soda Springs dryland location of Eastern District, Alpowa, Babe, and Penawawa and yielded 65, 64, and 62 bu/A, respectively. In Parma, out of twelve entries, the highest yielding variety was Dayn hard white spring (103 bu/A), Kelse (98 bu/A), UI Winchester (97 bu/A), and Klasic (96 bu/A).

Among hard wheats, WB-Hartline (HW), Glee (DNS), AP-Bullseye (DNS) and Jefferson (DNS) were the highest yielding in northern Idaho (80, 80, 75 and 74, respectively). In SC and SE Idaho, Dayn, Bullseye, Volt and Choteau (103, 93, 92, and 92 bu/A, respectively) were the superior performers in irrigated trials. The irrigated hard red and white varieties averaged 15.1% grain protein. In the Soda Springs dryland trial, UI Winchester, Blanca Grande, Kelse, and Choteau yielded best (68, 64, 63, and 60 bu/A, respectively), with a nursery average of 57 bu/A. The dryland hard spring trial had average proteins of 14.2%.

PROJECTIONS: Results of the accomplishments will be published and used by growers, consultants, industry representatives, and public and private breeders. Results will also be presented at cereal schools.

Additional information can be found on the website <http://www.extension.uidaho.edu/cereals/>, where links to all reports in all districts are available.

PUBLICATIONS:

Brown, B. Spring Cereal Variety Performance. The Cereal Sentinel. Issue 62. May 24, 2013. pp 1-10.
<http://www.extension.uidaho.edu/swidaho/Newsletters/Sentinel62.pdf>

- Marshall, J.M., Jackson, C.A., Shelman, T., Beck, L., and O'Brien, K. Jan 2013. 2012 Small Grains Report, Southcentral and Southeast Idaho Cereals Research and Extension Program. Idaho Agricultural Experiment Station. UI Research Bulletin 181. 137 pp.
- Marshall, J.M. 2013. New Year, New Challenges: Unprecedented Levels of BYDV in Our Winter Grain. Fall 2013. Idaho Grain Magazine. p. 17.
- Marshall, J.M., Brown, B.D., and Finkelburg, D. 2011-2012 Idaho Winter Wheat Variety Performance Tests and 2010-2012 Yield Summaries. Idaho Grain Producers magazine. Fall 2013. p. 21-23.
- Marshall, J.M. and Finkelburg, D. 2012 Idaho Spring Wheat Variety Performance Tests and 2010-2012 Yield Summaries. Idaho Grain Producers magazine. Spring 2013. p.22-23.
- Schroeder and Finkelburg, D. 2013. 2012 Small Grain and Grain Legume Report. University of Idaho Research Bulletin. Winter 2013.
- Marshall, J.M., Shelman, T., and Jackson, C.E. 2013. Foliar fungicide treatments for control of stripe rust in spring wheat, Bingham Co, ID, 2012. In section: Cereal and Forage Crops. Plant Disease Management Reports: 7:CF038.
<http://www.plantmanagementnetwork.org/pub/trial/pdmr/reports/2013/CF038.pdf>
- Marshall, J.M., Shelman, T., and Jackson, C.E. 2013. Foliar fungicide treatments for control of stripe rust in spring wheat, Bingham Co, ID, 2012. In section: Cereal and Forage Crops. Plant Disease Management Reports: 7:CF040.
<http://www.plantmanagementnetwork.org/pub/trial/pdmr/reports/2013/CF040.pdf>
- Marshall, J.M., Shelman, T., Jackson, C.A., and Beck, L. 2012 Idaho Wheat and barley variety performance tests and three-year summaries. Proceedings of the University of Idaho Commodity Schools, 2013.
- Marshall, J.M., Shelman, T., Jackson, C.A., and Beck, L. 2012 Cereal Disease Issues in southern and south eastern Idaho. Proceedings of the University of Idaho Commodity Schools, 2013.
- Zhang, J. Chen, J., Y. Wang, B. Bowman, J. Wheeler, W, Zhao, K. O'Brien, J.M. Marshall, H. Bockelman, and J. Bonman. Association mapping of Hagberg falling number in hard white spring wheat collection materials. Use of Molecular Tools to Enhance Breeding Efforts. Crop Sci. 2012: 241-5. <https://dl.sciencesocieties.org/publications/meetings/2012am/9995>
- Sweemer, T., Flowers, M., Mundt, C., Guy, S., Marshall, J., and Finkelburg, D. Managing Stripe Rust in Pacific Northwest Winter Wheat. 2012 ASA Abstract. Crop Sci. 2012: 66-4
<https://dl.sciencesocieties.org/publications/meetings/2012am/9858/73976>
- Chen, J., J. Wheeler, J. Clayton, W. Zhao, K. O'Brien, C. Jackson, J. M. Marshall, B.D. Brown, K. Campbell, X.M. Chen, R. Zemetra, and E.J. Souza. 2013. Registration of 'UI Stone' Wheat. J. Plant Registration 7: 321-326.
- Smiley, R. W., Marshall, J. M., Gourlie, J. A., Paulitz, T. C., Kandel, S. L., Pumphrey, M. O., Garland-Campbell, K., Yan, G. P., Anderson, M. D., Flowers, M. D., and Jackson, C. A. 2013. Spring wheat tolerance and resistance to *Heterodera avenae* in the Pacific Northwest. Plant Disease 97: 590-600.

In addition the tables were sent out specifically to Idaho, Oregon, Washington and Montana seed dealers, and extension personnel, PNW public and private wheat and barley breeders and specialists.

Table 1. Wheat nursery locations and site information, 2013 harvest.

Location	District	Winter/ Spring	Irrigated/ Dry	Number of Entries	Average Yield	Yield Range
Tensed	N	W	Dry	56	142	104-176
Moscow	N	W	Dry	56	107	84-138
Lewiston	N	W	Dry	56	99	75-124
Bonnars Ferry	N	W	Dry	56	96	48-122
Genesee	N	W	Dry	56	95	77-107
Craigmont	N	W	Dry	56	82	65-97
Bonnars Ferry	N	S	Dry	32	93	72-117
Genesee	N	S	Dry	32	77	66-85
Moscow	N	S	Dry	32	74	52-90
Craigmont	N	S	Dry	32	59	51-65
Parma	S	W	Irrigated	73	153	125-175
Parma	S	S	Irrigated	12	90	73-103
Kimberly	S	W	Irrigated	60	108	86-136
Rupert	E	W	Irrigated	60	83	57-117
Rupert	E	S	Irrigated	39	101	79-119
Aberdeen	E	W	Irrigated	60	140	106-175
Rockland	E	W	Dry	30	18	4-26
Ririe	E	W	Dry	54	17	8-23
Soda Springs	E	W	Dry	26	23	9-40
Aberdeen	E	S	Irrigated	39	103	64-124
Idaho Falls	E	S	Irrigated	39	93	72-111
Ashton	E	S	Irrigated	39	76	52-89
Soda Springs	E	S	Dry	29	59	50-68