Grant Code: AN3638

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)
Dr. Olga Walsh, Parma, Ext. Crop Mgmt. (SW Idaho)

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Justification/Rationale: 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.

Objectives:

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

Procedures/Plan of work:

Extension Wheat Nurseries. The Extension Wheat Nurseries are coordinated through the leadership of the Extension Cereal Specialists. County Extension Educators may assist as local coordinators of some of the trials. Fourteen winter nurseries were planted and 7 spring nurseries are planned for the 2019-2020 season. There is 1 Parma winter nursery and 1 spring nursery planned (irrigated); 7 winter nurseries (4 irrigated, 3 dryland) and 5 spring nurseries planned (4 irrigated, 1 dryland) in SE Idaho; 6 winter (all dryland or rainfed) and 1 spring nursery planned (all rainfed) in north Idaho. Spring wheat locations in Bonners Ferry, Craigmont and Moscow as well as the winter wheat trial in Moscow or Genesee will be discontinued due to reductions in

college funding of technical staff. 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 (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 most 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 other stakeholders visit the nurseries at times other than the scheduled tour.

Duration: Continuous

Cooperation/Collaboration:
Aberdeen Wheat Quality Laboratory: Katherine O'Brien, Director. County Extension Educators, IWC, IBC, IGPA, Craig Morris and Doug Engle, PNW Wheat Quality lab in Pullman, WA, public and private breeders, and grower cooperators.

Anticipated Benefits, Expected Outcomes and Impacts, and Transfer of Information: 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.

FY2021

IDAHO WHEAT COMMISSION - BUDGET FORM

Principal Investigator: Juliet M. Marshall

If applicable,	**Allocated by**	**Idaho Wheat Commission**	**during FY 2019**	**$**	**61,175**
If applicable,	**Allocated by**	**Idaho Wheat Commission**	**during FY 2020**	**$**	**61,175**

REQUESTED FY2021 SUPPORT:

Budget Categories	(10) Salaries (*staff, post-docs, etc.*)	(12) Temp Help	(11) Fringe	(20) Travel	(30) OE	(70) Graduate Tuition/ Fees	TOTALS
Idaho Wheat Commission	**$ 37,152**	**$ 6,500**	**$ 17,679**	**$ 5,250**	**$ 5,750**	**$ -**	**$ 72,331**

TOTAL BUDGET REQUEST FOR FY 2021: **$ 72,331**

BREAKDOWN FOR MULTIPLE SUB-BUDGETS:

Budget Categories	*Marshall*	*Schroeder*	*Walsh*	*(Insert CO-PI Name)*
(10) Salaries	**$ 18,717**	**$ 15,935**	**$ 2,500**	**$ -**
(12) Temp Help	**$ -**	**$ 6,500**	**$ -**	**$ -**
(11) Fringe Benefits	**$ 7,580**	**$ 9,086**	**$ 1,013**	**$ -**
(20) Travel	**$ 2,750**	**$ 2,500**	**$ -**	**$ -**
(30) Other Expenses	**$ 2,250**	**$ 2,000**	**$ 1,500**	**$ -**
(70) Graduate Student Tuition/Fees	**$ -**	**$ -**	**$ -**	**$ -**
TOTALS	**$ 31,297**	**$ 36,021**	**$ 5,013**	**$ -**

Total Sub-budgets **$ 72,331**

Brief Explanatory Comments: (see FY2021 RFP for guidance)

Spring wheat locations in Bonners Ferry, Craigmont and Moscow as well as the winter wheat trial in Moscow or Genesee will be discontinued due to reductions in college funding of technical staff. Increase in salary category is required to cover the costs associated with the research technician that will assist with these trials in northern Idaho.

Fall 2019 Version

ANNUAL REPORT

Grant Code: AN3638

Title: Extension Wheat Nurseries

Personnel: Dr. Juliet M. Marshall, Ext. Cropping Systems Mgmt Specialist, Aberdeen
Dr. Kurtis Schroeder, Ext. Cropping Systems Mgmt Specialist, Moscow
Dr. Olga Walsh, Ext. Cropping Systems Mgmt Specialist, Parma

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Accomplishments: Replicated wheat trials were conducted at thirteen winter and ten spring locations for harvest in 2019. 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 nine 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 subsamples 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 currently being processed at the Wheat Quality Lab in Aberdeen, ID. 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. Refer to the publications below for a complete listing of published results. In addition to the winter reports and presentations, 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 were placed that acknowledged the support from the Idaho Wheat Commission. University of Idaho Cereal Schools, coordinated by specialists, county educators and industry representatives, 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 and usually are variable throughout the state. In northern Idaho, winter wheat yields were average to above average with the exception of Bonners Ferry. The seeding at Bonners Ferry was a little deeper than desired, there was significant rainfall in March along with below normal temperature and severe Hessian fly pressure in the plot. Seeding conditions were dry in the fall of 2018 and the winter was mild with the exception of February and March which experienced below normal temperatures. Vigor of winter wheat looked poor in

the spring, but timely rain and mild temperatures throughout spring and summer months led to adequate yields and test weights. Spring wheat yields in northern Idaho were below normal due to wet and cool conditions in March and April which delayed seeding. Hessian fly was evident in the spring wheat plots in Bonners Ferry. Aside from Hessian fly, pest and disease pressure were low with very little stripe rust at any of the trial locations. While not severe, the Moscow winter wheat location had symptoms of Cephalosporium stripe.

In eastern Idaho, there were good conditions for planting winter grain on irrigated but planting into winter dryland ground was delayed due to the lack of moisture. September precipitation was below 10-year and 105-year averages, but October moisture levels were more normal, giving a late but decent start to the planting year. Spring planting conditions were cool and wet, delaying planting in some areas - planting at Ashton was delayed a little due to spring rain. Most locations were seeded at similar timings to the previous year.

Severe spring storms with multiple hail events severely damaged areas throughout southern and eastern Idaho. The precipitation amounts from February through in May was at or above average, with cool temperatures that delayed maturity and harvest from five to 10 days. Late season frosts substantially reduced yields of spring wheat and spring barley in Aberdeen, otherwise yields were good to very good at various irrigated locations, good at Soda Springs, but below average at the dryland locations. Below average precipitation in June through August allowed the crop to finish, although late, while upper elevation areas remained at high moisture levels through harvest. Early season diseases were problematic in the spring grain, such a Pythium and Rhizoctonia. In the winter grain, strawbreaker foot rot (also called eyespot), take-all and Rhizoctonia were prevalent due to high levels of spring soil moisture. Late season stripe rust reduced yield mostly in susceptible spring wheat varieties and some spring barleys. Fusarium head blight was not a widespread problem due to low temperatures. There were some areas around Rupert and Burley where malt barley planted after corn had low levels (1-2 ppm) of DON, the mycotoxin resulting from head infection by FHB.

Grower yields were considered average to above average throughout the area, and crop quality was considered good to excellent with little DON contanimation from Fusarium head blight.

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:

Marshall, J.M., Jackson, C.A., Shelman, T., Jones, L., Arcibal, S., and O'Brien, K. 2019. 2018 Small Grains Report, Southcentral and Southeastern Idaho Cereals Research and Extension Program. Idaho Agricultural Experiment Station. Research Bulletin 196. 157 pp.

Schroeder, K., White, D., and McGinnis, A. 2019. 2018 Small Grain and Grain Legume Report, Northern Idaho Small Grain and Grain Legume Research and Extension Program. Idaho Agricultural Experiment Station, Research Bulletin 201. 66 pp.

Marshall, J., and Schroeder, K. 2019. 2018 Idaho spring wheat variety performance tests and 2016-2018 yield summaries. Idaho Grain Magazine, Spring, pp. 23-26.

Table 1. Wheat nursery locations and site information, 2019 harvest.						
Location	**District**	**Winter/ Spring**	**Irrigated/ Dry**	**Number of Entries**	**Average Yield (bu/A)**	**Yield Range (bu/A)**
Bonners Ferry	N	W	Dry	63	40	18-65
Genesee	N	W	Dry	68	103	81-117
Moscow	N	W	Dry	67	134	95-164
Nezperce	N	W	Dry	67	124	108-138
Tammany	N	W	Dry	69	108	92-128
Tensed	N	W	Dry	68	124	110-154
Bonners Ferry	N	S	Dry	36	48	31-67
Craigmont	N	S	Dry	41	57	47-67
Genesee	N	S	Dry	40	80	70-88
Moscow	N	S	Dry	40	56	39-69
Parma	S	W	Irrigated	49	85	65-103
Parma	S	S	Irrigated	35	108	97-123
Kimberly	S	W	Irrigated	65	178	146-207
Rupert	E	W	Irrigated	65	148	100-169
Rupert	E	S	Irrigated	50	126	109-151
Aberdeen	E	W	Irrigated	65	161	116-196
Rockland	E	W	Dry	63	30	15-44
Ririe	E	W	Dry	76	22	15-28
Soda Springs	E	W	Dry	76	55	36-81
Aberdeen	E	S	Irrigated	50	96	71-119
Idaho Falls	E	S	Irrigated	49	118	94-143
Ashton	E	S	Irrigated	47	77	58-94
Soda Springs	E	S	Dry	47	75	55-91