

**Minnesota Wheat Research and Promotion Council  
CROP YEAR 2012 RESEARCH REPORTING FORM  
Form Due November 15, 2013**

<b>1. PROJECT TITLE</b>  Southern Minnesota Wheat Research	
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<b>4. REPORT DATE</b>  November 15, 2013	<b>5. REPORTING PERIOD</b>  March 20 to Dec. 31, 2013
<b>6. TERMINAL REPORT</b> ___X___ <b>PROGRESS REPORT</b> _____	
<b>7. AMOUNT OF GRANT</b>  <u>2012</u> : \$15,447	
<b>8. PUBLICATIONS</b>  Anderson, J.A. J.J. Wiersma, S. Reynolds, R. Caspers, C. Springer, J. Kolmer, Y. Jin, R. Dill-Macky. 2013. Hard Red Spring Wheat. In: 2013 Minnesota Field Crop Trials. Minnesota Agricultural Experiment Station Publication MP 120-2014. University of Minnesota, St Paul, MN.	

## 9: EXECUTIVE SUMMARY

### Research Question and Objectives:

1. Establish wheat research plots at three southern MN locations (Benson, Kimball and LeCenter) for data collection to address production and management issues of regional producers.
2. Compare genetic performance of current and new HRWW and HRSW varieties in southern MN.
3. Utilize these sites as demonstration and field day settings for summer hands-on workshops.
4. Serve as sampling site for wheat pest scouts in identifying regional insect and disease presence and severity.
5. Serve as a site for the MWRPC funded project 'Seed Treatment Trial to Evaluate the Relative Effectiveness of Different Active Ingredients Against Latent Root Rots and Crown Rots of Wheat' (collaborative project with Dr. M.J. Smith).

### Results:

Table 1 illustrates the yield performance of 27 cultivars produced at two southern MN locations. This is a reduction of entries from the 44 evaluated in 2012 as only those with true potential in these regions were included for evaluation in 2013. It was also expanded to include three locations with the addition of Kimball. Environmental factors preventing timing planting resulted in the LeCenter site not being planted to spring wheat and the barley plots not seeded at any of the three sites.

At the Benson site, yields ranged from 96.9 (LCS Albany) to 73.5 (Rollag at 1.3X seeding rate) Bu/A. The mean average for the site was an impressive 87.7 Bu/A when factoring in a planting date of May 2<sup>nd</sup>. Seven varieties topped 90 Bu/A.

At the dryland/light soil Kimbal site, yields ranged from 76.5 (SY Rowyn) to 61.3 (Rollag at 1.3X seeding rate and Faller) Bu/A. The mean average for the site was a respectful 67.8 Bu/A when factoring in a planting date of May 3<sup>rd</sup>.

With sites analyzed together, WB Digger was the highest yielding at 83.5 Bu/A and Rollag at 1.3X seeding rate was lowest 67.5 Bu/A.

Table 2 outlines the yield performance of 24 Hard Red Winter Wheat varieties seeded at LeCenter, MN. The winter of 2012/2013 was very selective in winterkill and percent stand survival. Stand survival in individual plots ranges from 5 to 98%. Seldom is such a range documented in that typically most entries either have nearly complete survival or death in response to overwintering conditions. The entries represented genetics from all over central and western US.

Yields ranged from 81.3 (WB-Grainfield) to 31.7 (Art) Bu/A. The mean yield for the site was 52.2 Bu/A. This is a low mean for winter wheat and can be easily explained by the severity of the winterkill and the inclusion of several varieties identified through this testing as not appropriate for this region. Expedition is a commonly grown variety in this area and those competitive with it will be tested in future years.

All quality, winter survival, moisture, lodging, and test weight data is still forthcoming and not represented in this report.

A second year of the spring wheat seed treatment study was seeded at the Kimball location. Those results can be seen with Dr. Madeleine Smith's grant report as data was combined with WC and NW MN locations and represented.

### **Application/Use:**

The yield trial data for HRWW and HRSW supplement the existing trials at the Southern Research & Outreach Centers (Waseca, Lamberton, and St. Paul) and is published in the 2013 Minnesota Field Crop Trials bulletin. This effort identifies varieties best suited for yield and quality in regions with an earlier planting date, shorter growing season, hotter temperatures and humidity, and earlier onsets of pests such as leafhoppers, cereal aphids, leaf rust, and Fusarium head blight. This more robust data set in turn allows southern MN wheat producers to improve variety selection.

The seed treatment studies address a long time question as to the economic outcome of added seed/plant protection and cost of products. Barley variety testing is being requested from individual maltsters in the region to identify the best genetics for their end use products.

These sites also served as gathering locations for summer field days. The field days were organized to present current agronomic updates and hands on discovery in the plot area with the identification of pests and verbal descriptions of the genetics on display. A total of 25 producers attended the LeCenter plot tour with much of the time devoted to discussions and questions and offered the opportunity to bring in field samples for diagnostics and explanations. The data collected will also be presented at three to four southern MN winter small grain workshops in 2014.

The small grain pest survey also frequently visited these sites as collection points in documenting pest presence or absence in the regions.

The purpose of the research sites and nine years of winter workshops in southern MN is to make certain that those producers interested in growing small grains gain access to the same level of knowledge as producers in Northwest Minnesota are accustomed to and in doing so giving producers an opportunity to get in front of pests problems such as soybean cyst nematode, corn rootworm, glyphosate resistance weeds, and iron chlorosis in corn/soybean rotations.

### **Materials and Methods:**

Cooperators were identified in Benson, (Scott Lee) Kimball (Dave Lochen) and LeCenter( Ron Pomije/Ruth Hoefs) to host the wheat research sites and provide the initial fertility and seedbed preparations as well as host summer field days. A 27 entry spring wheat cultivar genetic evaluation study and seed treatment study were designed for the locations as duplicates of each other. The 27 cultivars were selected from private and public breeding programs in the Midwest region and adapted to our environment. University of MN experimentals were also included for observation measurements. A 24 entry winter wheat cultivar genetic evaluation study was also designed. Five seed treatments differing in chemistries and seedling diseases protection were identified to be evaluated against an untreated check.

An extended winter and delayed spring with cold and wet altered what the initial planting plans were. The winter wheat cultivar evaluation was seeded in LeCenter as the only study due to spring planting conditions. Kimball and Benson hosted the spring wheat cultivar evaluations with Kimball also having the seed treatment study. Environmental and location logistics preventing the planting of the spring wheat cultivar study, seed treatment, and barley cultivar evaluation in LeCenter and seed treatment and planting population study in Kimball.

The LeCenter site had a previous crop of peas and the Benson/Kimball sites were soybean. Spring sites were planted May 2<sup>nd</sup> and 3<sup>rd</sup> and harvested August 13th. Winter wheat in LeCenter was planted Sept. 20

and harvested July 31<sup>st</sup>.

Seeding equipment was used from the Northwest Research and Outreach Center to plant plots. Each of the cultivars was replicated four times and the seed treatments six times. The weighing of thousand kernel weights of each seed lot ensured all seeding rates were constant with plots established and maintained at 15 feet in length and five feet in width. Row spacing was six inches with plots placed side by side and eight feet alleys between ranges. Broadleaf/grass weed control was done at the four leaf stage in LeCenter with a helicopter hired to do the whole field and the Kimball and Benson site done with research sized equipment in a timely manner. No late season fungicides were applied to any sites.

Harvesting was done with a five foot wide Zurn plot combine owned by the MN Wheat Growers and operated by personnel from the Northwest Research and Outreach Center. Variables measured included yield, test weight, moisture, lodging, plant height, and protein. Analysis was done by Dr. Jochum Wiersma in Crookston and represented by the research team.

**Economic Benefit to a Typical 500 Acre Wheat Enterprise:**

Few if any of the producers we are working with in these regions have 500 or more wheat acres but rather something in the line of 40 to 200 acres. This research and programming allow producers to identify the best genetics available for their operation. Our sites also serve as a model for plant populations, agronomic practices, pesticides, growth staging, and fertility approaches to assist economically sustainable production.

**10: RELATED RESEARCH (effort)**

This project ties into the St. Paul hard red spring wheat breeding program by adding three sites of representation and contributes strength to the data collected in southern MN. It also is connected to the University of MN small grain pathology partners as these locations were used as sources for pest collection and identification.

## **11: RECOMMENDED FUTURE RESEARCH**

It is our belief that the sites be maintained for another year. The first two years were a large success based on the attendance at the summer field days and calls for the data post harvest. An additional year is needed to substantiate initial data collections but also to begin incorporating agronomic research projects such as planting populations and winter wheat production in an attempt to maximize bushel production. A no cost carryover proposal has been submitted in an attempt to have the efforts funded for another year. Cooperators are in agreement and have volunteered land and equipment.

**12: APPENDIX**

**TABLE 1. Variety Yield Performance Data of 27 Cultivars at Two Southern MN Sites**

<b>Cultivar</b>	<b>Benson</b>	<b>Kimball</b>
Advance	91.2	69.0
Barlow	86.8	68.0
Breaker	81.1	67.7
Edge	85.9	68.4
Elgin-ND	86.3	65.0
Faller	94.7	61.3
Forefront	91.0	70.9
Glenn	77.4	72.9
Jenna	96.0	66.3
Knudson	89.2	68.8
LCS Albany	96.9	68.2
LCS Breakaway	90.8	68.4
LCS Powerplay	87.7	66.5
Linkert	80.8	68.5
Marshall	81.7	59.4
Norden	84.5	58.6
Prosper	90.0	69.9
RB07	86.8	61.7
Rollag	77.5	62.8
Rollag (1.3X)1	73.5	61.4
Samson	88.4	70.0
Select	87.9	70.4
SY-Rowyn	88.1	76.5
SY-Soren	86.1	66.8
Vantage	83.8	66.8
WB-Digger	96.2	70.8
WB-Mayville	92.0	72.3
Mean (Bu/Acre)	87.7	67.8
LSD (0.10)	7.8	6.7
CV	6.5	7.3

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**12: APPENDIX (continued)****TABLE 2. Variety Yield Performance Data of 24 HRWW Cultivars in LeCenter**

<u>Entry</u>	<u>LeCenter</u>
AC Broadview	60.6
Accipiter	57.8
Arapahoe	57.0
Art	31.7
Boomer	69.2
CDC Falcon	46.4
Darrell	60.6
Decade	67.0
Expedition	67.1
Flourish	53.3
Freeman	43.0
Ideal	61.3
Jerry	56.3
Lyman	38.7
Millennium	36.0
Moats	38.5
Overland	46.3
Peregrine	59.7
Roughrider	43.7
Settler CL	33.1
Sunrise	41.6
SY Wolf	76.3
WB-Grainfield	81.3
WB-Matlock	67.9
Mean (Bu/Acre)	52.2
LSD (0.10)	32.4

Picture 1. Planting of the DeGraff, MN Small Grain Research Site.



Picture 2. LeCenter Small Grain Research Site with Cooperator Ron Pomiji and U of MN Educator Diane DeWitte.



**12. APPENDIX (Continued)**

Picture 3. Plot Harvest in Southern MN.

