Southern Minnesota Small Grains Research and Outreach Project

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Research Questions

The objectives of the grant were to:

1) Establish variety performance evaluation trials for HRSW and HRWW near Montgomery, Kimball and Benson.
2) Organize extension programming focused on small grains production and management in southern Minnesota.

Results

The Southern Wheat Tour encompasses the winter extension programming efforts for small grains in central and southern Minnesota. These meetings were held in Cold Spring, LeCenter, Slayton, and Benson in the third week of February and were attended by nearly 120 producers. The winter wheat trial in Kimball were lost due to an unexpected herbicide carryover issue. The winter wheat trial in LeCenter averaged 87 bu/acre, with highest yielding variety exceeding 125 bu/acre. The average yield across the 3 spring wheat locations funded by this grant was 93 bu/acre for spring wheat. All three locations served as sentinel plots for the small grains pest surveys and were used for summer plot tours that were attended by 30 producers. Detailed results can be found in tables 1 and 2 (Appendix I).

Application/Use

Hard red spring, winter wheat, winter rye, barley, and oats have been grown in central and southern Minnesota for decades but not in large acreages. Producers in these regions are now incorporating more intense management systems to maximize yield and quality on their small grain acres with genetics, input products, and fertility systems on productive soils including irrigation. The rising awareness of cover crops, crop rotation benefits, current economic markets and recent years have contributed to an increased awareness of the agronomic benefits and economic opportunities of small grains. Producers with dedicated intense production of small grains have demonstrated the ability to do so very successfully with yield and quality. Testimony of individual producers during plot tours and workshops suggest that 90 bushel spring and winter wheat and 150 bushel oat are routinely attained in production fields. This replicates what our research and demonstrations plots have documented. This underscores the importance that the University of Minnesota conducts high quality yield trials that demonstrate the maximum attainable yield rather than simply demonstrate relative differences between cultivars.

Material and Methods

The winter wheat and rye variety trials with 27 and 18 entries, respectively, were seeded on October 1st, 2016 near Montgomery and Kimball. The spring wheat, oats, and barley variety trials with 55, 28, and 18 entries, respectively, were seeded adjacent to the winter cereals at the same two locations on April 7th. In addition, a spring variety trial was seeded near Benson two days prior on April 5th. All trials used a Randomized Complete Block design with 3 replications. Field preparations and some of the fertility management were done by the cooperators with planting, weed control, data collection, and harvest completed by the research group.

Economic Benefit to a Typical 500 Acre Wheat Enterprise

Spring and winter wheat should be an essential part of Minnesota's agriculture. Providing small grain producers with the latest and most recent production and management information and educating producers which cultivars are best suited for their production system are critical to the economic well-being of Minnesota. A 10% increase in yield equates to nearly $18,000 in gross returns for a 500 acre wheat enterprise at today's market prices.

Related Research

These trials are an integral part of the University of Minnesota Spring Wheat, Barley, and Oat Breeding Programs and the Extension's Commodity Crops Team programming efforts. The rye variety trials are part of a Minnesota Department of Agriculture grant entitled 'The Flavor and Agronomic Performance of Winter Rye for the Craft Distillers in Minnesota'.

Publications

Results of yield trials for spring and winter wheat, barley, and oats are part of the variety trial results that will be published in the on-line publication '2017 Minnesota Field Crop Trials'. The 2016 trial results were published in:

1. Anderson J.A, J.J. Wiersma, S. Reynolds, and C. Springer. 2016. Hard Red Spring Wheat. In: 2016 Minnesota Field Crop Trials. Minnesota Agricultural Experiment Station Publication MP 121-2017. University of Minnesota, St. Paul, MN.

2. Smith, K., E. Schiefelbein, J.J. Wiersma, R. Dill-Macky, M. Smith, and B. Steffenson. 2016. Barley. In: 2016 Minnesota Field Crop Trials. Minnesota Agricultural Experiment Station Publication MP 121-2017. University of Minnesota, St. Paul, MN.

3. Tiede, T., J.J. Wiersma, R. Dill-Macky, and H. Rines. 2016. Oat. In: 2016 Minnesota Field Crop Trials. Minnesota Agricultural Experiment Station Publication MP 121-2017. University of Minnesota, St. Paul, MN.

4. Wiersma, J.J. and J.A. Anderson. 2016. Hard Red Winter Wheat. In: 2016 Minnesota Field Crop Trials. Minnesota Agricultural Experiment Station Publication MP 121-2017. University of Minnesota, St. Paul, MN.

Appendix

Table 1 – Relative grain yield of HRSW varieties at three on-farm trial locations in southern Minnesota in single (2017) and multiple year comparisons (2015).

Variety	Benson				Kimball				Le Center		
	2017	2 yr	3 yr		2017	2 yr	3 yr		2017	2 yr	3 yr
	----------(% of mean)----------										
Bolles	78	85	90		102	100	99		89	95	92
Boost	86	90	91		103	97	96		95	95	93
Chevelle	82	96	102		96	93	100		109	102	102
Dyna-Gro Ambush	105	99	–		98	98	–		101	100	–
Dyna-Gro Caliber	101	–	–		94	–	–		90	–	–
Faller	105	103	102		98	96	92		92	95	98
Forefront	109	98	96		102	103	102		99	96	99
HRS 3361	97	100	95		99	97	97		106	106	105
HRS 3419	118	114	108		99	111	116		112	122	120
HRS 3504	114	114	111		94	97	98		106	102	105
HRS 3530	106	111	111		100	103	100		116	111	109
HRS 3616	79	90	–		103	102	–		98	104	–
Lang-MN	96	97	97		105	102	99		89	90	97
LCS Albany	103	105	107		108	110	112		102	110	108
LCS Anchor	88	91	–		96	101	–		103	90	–
LCS Breakaway	102	97	96		103	106	100		92	90	92
LCS Iguacu	99	99	99		99	106	105		107	112	107
LCS Nitro	102	105	104		99	106	109		107	117	114
LCS Prime	114	112	110		98	96	100		110	102	102
LCS Rebel	93	–	–		95	–	–		92	–	–
Linkert	99	96	94		93	101	99		99	93	96
ND-VitPro	86	88	–		101	100	–		85	85	–
Prevail	104	103	98		106	109	111		101	100	102
Prosper	114	109	110		107	100	98		104	101	100
RB07	87	94	95		100	98	99		97	92	91
Rollag	98	96	97		98	97	97		100	96	94
Shelly	94	100	103		106	100	104		106	107	101
Surpass	108	102	102		108	96	93		90	83	88
SY Ingmar	96	103	102		90	103	105		104	109	108
SY Rowyn	109	109	105		96	99	102		97	103	101
SY Soren	87	95	94		110	109	105		105	106	99
SY Valda	117	115	112		100	98	100		119	116	115
TCG-Climax	91	–	–		95	–	–		81	–	–
TCG-Cornerstone	97	96	–		96	96	–		102	102	–
TCG-Spitfire	101	98	–		102	102	–		110	105	–
WB-Mayville	120	109	102		108	108	102		106	104	104
WB9479	110	–	–		102	–	–		93	–	–
WB9590	119	–	–		103	–	–		93	–	–
WB9653	111	109	109		97	94	100		110	105	106
Mean (bu/acre)	94	104	104		95	80	86		90	85	86
LSD (0.1)	15.0	6.4	5.3		13.4	7.9	6.4		11.4	7.6	6.0