Small Grain Variety Trials

Stefan Gailans, Practical Farmers of Iowa
Emma Link, Practical Farmers of Iowa
Ken Pecinovsky, farm superintendent

Introduction

Careful management and proper variety selection can make small grains profitable in crop rotations due to their low input requirements and beneficial effects on succeeding crops. When grown as a cash crop cereal rye and oats can be marketed for cover crop seed, grain, straw, forage, hay or haylage. Their mid-summer harvest allows for a myriad of field management options for the remainder of the season, such as mid-season manure application or the establishment of a perennial forage crop.

Practical Farmers of Iowa has been collaborating with Iowa State Research Farms to trial small grain varieties since 2015. This past year, cereal rye, triticale and oats were trialed at the Northeast Research and Demonstration Farm.

Materials and Methods

Eleven varieties of cereal rye (and one triticale variety) and 16 varieties of oats were trialed in 2023. Management information for each trail can be found in Table 1. No herbicides or insecticides were applied. Data were analyzed using R statistical software. Statistical significance is determined at $P \leq 0.10$ level (unless otherwise noted) and means separations are reported using Tukey's least significant difference (LSD).

Results

Rye yields ranged from 46 to 72 bushels/acre with an average of 56. The four hybrid rye varieties (Bono, Receptor Serafino, Tayo) had the highest yield. Rye straw yields ranged from 0.9 to 2.1 tons/acre with an average of 1.6.

Oat yields ranged from 109 to 133 bushels/acre with an average of 121. Test weight ranged from 33 to 38 lb/bushel with an average of 36. Antigo was the only variety at the site to have a test weight meet food grade specifications (Table 3). Oat straw yields ranged from 1.1 to 1.7 tons/acre with an average of 1.4.

Further information about the trials, such as the characteristic of each variety and their source, can be found on Practical Farmers of Iowa website:

https://practicalfarmers.org/research/cereal-rye-and-triticale-variety-trial-2023/

https://practicalfarmers.org/research/oat-variety-trial-2023/

Acknowledgements

This work is supported by the Agriculture and Food Research Initiative, grant number F9000315202081 from the USDA National Institute of Food and Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Agriculture.

Acknowledgements (cont.)

We would also like to express our gratitude to Albert Lea Seed House, Green Cover, KWS, Welter Seed and Honey Co., Zabel Seeds, North Dakota State University, South Dakota State University Seed Foundation and University of Wisconsin Foundation Seeds for donating seed for these variety trials.

Table 1. Management information for small grain variety trials in the Northeast Research and Demonstration Farm in 2023.

	Cereal rye & triticale trial	Oat trial
Previous crop	Soybeans	Soybeans
Replications	3	3
Harvested plot size	8.125 ft × 50 ft	8.125 ft × 127 ft
Fertilizer applied	60 lb P/ac and 160 lb K/ac on November 8, 2022. 25.5 lb S/ac on November 23, 2022. 30 lb N/ac on April 3, 2023.	60 lb P/ac and 160 lb K/ac on November 8, 2022. 25.5 lb S/ac on November 23, 2022. 30 lb N/ac on April 3, 2023. 30 lb N/ac as urea on April 3, 2023.
Tillage	None	Field cultivator to incorporate urea on April 3, 2023
Planting date	October 6, 2022	Apr. 4, 2023 followed by cultipacking
Row spacing	7.5 in.	7.5 in
Seeding rate	Variable to achieve target planting population.	4 bu/ac
Seeding depth	1.25 in.	1.5 in.
Harvest date	July 18, 2023	July 17 (grain), July 18 (straw)

Table 2. Yield (grain and straw), test weight, plant height, and germination of cereal rye varieties.

	Yield					
	(bu/ac)	(% of site avg.)	5-yr avg. (bu/ac)	Test Weight (lb/bu)	Straw Yield (ton/ac)	Plant Height at Harvest (in.)
Aroostook	48	86	43	56	2	52
Bono	72	129	78	56	2	39
Danko	55	99	68	56	1	45
Elbon	41	74	43	56	2	54
Hazlet	53	94	57	56	2	50
ND Dylan	51	91	52	56	2	54
ND Gardner	48	86	58	56	2	53
Receptor	65	117	--	56	1	40
Serafino	68	122	82	56	2	41
Spooner	46	83	51	56	1	55
Tayo	65	117	--	55	1	39
Tulus	58	104	--	52	1	30
LSD (90%)	5	--	--	0.3	0	1
MEAN	56	--	59	56	2	46

By response variable, if the difference between any two entries is greater than the least significant difference (LSD) the entries are considered statistically different with 90% confidence.

Table 3. Yield, test weight, plant height, and straw yield of oat varieties.

	Yield				
VARIETY	(bu/ac)	(% of site avg.)	9-yr avg. (bu/ac)	Test Weight (lb/bu)	Straw Yield (ton/ac)
Antigo	115	95	112	38	1.2
Deon	121	100	125	35	1.4
Esker 2020	133	110	135	33	1.2
Goliath	132	109	129	36	1.5
Hayden	130	107	129	36	1.5
Jerry	109	90	110	36	1.4
Mink	110	94	129	37	1.3
MN Pearl	114	91	110	35	1.3
Morton	125	103	117	33	1.7
Natty	130	107	127	36	1.2
Reins	125	103	122	37	1.3
Rushmore	121	100	134	37	1.5
SD Buffalo	115	94	128	34	1.5
Saddle	123	101	128	36	1.5
Shelby 427	120	99	117	37	1.6
Sumo	114	94	113	36	1.1
Warrior	123	102	124	35	1.4
Mean	121	--	--	36	1.4
LSD (90%)	12	--	--	0.5	0.2

By response variable, if the difference between any two entries is greater than the least significant difference (LSD) the entries are considered statistically different with 90% confidence.
9-yr. average yields are listed for varieties trialed at least twice in the past nine years at this location.