Small Grain Variety Trials

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Careful management and proper variety selection can make small grains profitable in crop rotations due to 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. The 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 and oats were trialed at the Ag Engineering and Agronomy Research Farm. This was the second year cereal rye was trialed and the fourth year oats were trialed in this location.

Materials and Methods

Ten varieties of cereal rye (and one triticale variety) and 17 varieties of oats were trialed in 2022. Management information for each trial can be found in Table 1. No herbicides or insecticides were applied. Seed samples of non-hybrid varieties of rye and triticale from each location were sent to the Iowa State Seed Testing Laboratory for germination testing. Germination seed samples were pooled across replicates at each site: therefore, germination data are not analyzed statistically. Data were analyzed using JMP Pro 15 (SAS Institute Inc., Cary, North Carolina). 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 34 to 86 bushels/acre with an average of 59. The four hybrid rye varieties (Bono, Receptor, Serafino, Tayo) had the highest yield. Rye and triticale seed germination ranged from 89 to 96% with an average of 94% (Table 2).

Table 1. Management information for small grain variety trials.

	Cereal rye and triticale trial	Oat trial
Previous crop	Soybean	Soybean
Replications	3	3
Harvested plot size	5 ft. × 61 ft.	5 ft. × 49 ft.
Fertilizer applied	30 lb. N/ac., 11 lb. P/ac., 40 lb. K/ac. and 25 lb. S/ac. on Apr. 11	30 lb. N/ac., 11 lb. P/ac., 40 lb. K/ac. and 25 lb. S/ac. on Apr. 11
Tillage	None	None
Planting date	Oct. 8, 2021	Apr. 19
Row spacing	7.5 in.	7.5 in.
Seeding rate	Variable to achieve target planting population of 23 seeds/ft.^{2}	4 bu./ac.
Seeding depth	1 in.	1 in.
Harvest date	July 29	July 29

Table 2. Yield, test weight, plant height, percent lodging, and germination of cereal rye and triticale varieties.

	Yield			Plant height at harvest, in.	Lodging at harvest, %	Seed germination, %
	bu./ac.	% of site avg.	Test weight lb./bu.			
Aroostook	57	96				
Bono	74	125	55	43	5	0
Danko	59	99	55	49	12	94
Elbon	34	58	54	51	53	96
Hazlet	50	85	54	50	12	95
ND Dylan	57	97	53	53	48	94
ND Gardner	41	69	53	55	68	94
Receptor	82	138	56	46	17	0
Serafino	72	121	55	44	10	0
Spooner	46	77	54	51	25	94
Tayo	86	145	54	46	7	0
Tulus (trit.)	53	90	44	37	0	89
LSD(90%)	23	0	3	4	20	0
MEAN	59	0	54	48	22	94

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.

Oat yields ranged from 80 to 110 bushels/acre with an average of 94. Test weight ranged from 33.8 to 40.3 lb./bushel. Three varieties had a test weight above the milling threshold: 38 lb./bushel. The highest yielding variety was Reins. Antigo had the highest test weight (Table 3).

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

Cereal Rye and Tritcate Trial
practicalfarmers.org/research/cereal-rye-and-triticale-variety-trial-2022

Oat Variety Trial
practicalfarmers.org/research/oat-variety-trial-2022

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Table 3. Yield, test weight, plant height and percent lodging of oat varieties.

	Yield					
	bu/ac.	% of site avg.	5-year. average, bu/ac.	Test weight, lb./bu.	Plant height at harvest, in.	Lodging at harvest, %
Antigo	100	107	85			
CS Camden	82	87	87	33.8	29	13
Deon	87	93	90	35.7	33	15
Esker 2020	92	99	101	34.5	32	15
Goliath	101	108	92	36.3	37	18
Hayden	83	88	86	37.3	32	0
Jerry	101	107	82	37.3	31	0
MN Pearl	88	94	95	37.1	31	0
Morton	87	93	95	35.3	35	0
Natty	97	103	88	35.9	34	2
Reins	110	117	98	38.8	27	0
Rushmore	98	105	113	37.8	31	0
Saddle	95	101	99	36.3	29	0
SD Buffalo	105	112	--	35.5	33	0
Shelby 427	87	93	82	37.4	34	0
Sumo	80	85	82	39.2	33	0
Warrior	98	105	103	35.4	29	0
MEAN	94	0	0	37.0	32	0
LSD (90%)	38	0	0	3.7	5	0

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.
5-year average yields are listed for varieties trialed at least twice in the past seven years at this location.