Small Grain Variety Trials

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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 and Demonstration Farms to trial small grain varieties since 2015. This year, cereal rye and oats were trialed at the Northeast Research and Demonstration Farm.

Materials and Methods

Eleven varieties of cereal rye (and one triticale variety) and 17 varieties of oats were trialed. 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 University seed testing laboratory for germination testing. Germination seed samples were pooled across replicates at each site, so 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 and Discussion

Rye yields ranged from 78 to 149 bushels/acre with an average of 112. The four hybrid rye varieties (Bono, Receptor, Serafino, Tayo) had the highest yield.

Table 1. Management information for small grain variety trials.

	Cereal rye and triticale trial	Oat trial
Previous crop	Soybeans	Soybeans
Replications	3	3
Harvested plot size	5 ft. × 57 ft.	5 ft. × 46 ft.
Fertilizer applied	65 lb. N/ac., 166 lb. P/ac. and 288 lb. K/ac. in Oct. 2021. 37 lb. N/ac. on Apr. 11.	261 lb. K/ac. on Nov. 1, 2021. 37 lb. N/ac. on Apr. 11
Tillage	None	None
Planting date	Sept. 29, 2021	Apr. 11
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	1.25 in.	1 in.
Harvest date	July 20	July 28

Rye and triticale seed germination ranged from 89% to 96% with an average of 94% (Table 2).

Oat yields ranged from 94 to 130 bushels/acre with an average of 117. Test weight ranged from 35.4 to 42.1 lb./bushel. Ten varieties had a test weight above the milling threshold: 38 lb./bushel (Table 3).

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

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

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

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

	Yield			Test weight, lb./bu.	Plant height at harvest, in.	Lodging at harvest (%)[b]	Seed germination (%)
	bu./ac.	percent of site average	4-year average, bu./ac.				
Aroostook	93	83	46	58	52	7	94
Bono	149	134	92	58	41	0	0
Danko	100	89	75	57	43	3	94
Elbon	89	80	45	56	51	10	96
Hazlet	118	106	68	56	48	3	95
ND Dylan	78	70	49	57	53	10	94
ND Gardner	91	82	66	55	52	10	94
Receptor	135	121	0	57	42	2	0
Serafino	147	132	95	59	42	2	0
Spooner	84	76	56	56	50	7	94
Tayo	133	119	0	56	40	0	0
Tulus (trit.)	122	109	0	52	35	0	89
LSD (90%)	51	0	0	2	4	5	0
MEAN	112	0	0	56	46	4	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.

Table 3. Yield, test weight, plant height, and percent lodging of oat varieties. Varieties with a test weight that meets food grade specification (≥ 38 lb./bu.) are highlighted.

	Yield			Test weight, lb./bu.	Plant height at harvest, in.	Lodging at harvest (%)[b]
	bu./ac.	percent of site average	4-year average, bu./ac.			
Antigo	120	103	91	42.1	33	7
CS Camden	109	93	97	35.6	39	0
Deon	124	106	99	38.0	40	0
Esker 2020	114	98	111	35.4	40	2
Goliath	106	91	89	39.0	42	12
Hayden	130	111	100	38.8	39	0
Jerry	122	104	81	39.9	37	0
MN Pearl	121	103	113	37.1	39	0
Morton	94	80	102	37.2	46	0
Natty	120	103	101	39.2	39	0
Reins	130	112	97	39.0	33	0
Rushmore	126	108	132	38.7	38	0
Saddle	130	111	115	37.7	34	0
SD Buffalo	123	105	0	37.9	40	0
Shelby 427	108	93	91	39.2	36	0
Sumo	101	87	85	40.0	38	0
Warrior	107	92	114	37.2	38	0
MEAN	117	0	0	38.3	38	0
LSD(90%)	30	0	0	02.4	7	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.
Eight-year average yields are listed for varieties trialed at least twice in the past seven years at this location.