

## Cereal Rye and Triticale Variety Trial 2023

### In a Nutshell:

- Eleven cereal rye varieties and one triticale variety were screened at four Iowa State University research farms.

### Key Findings:

- Across sites and varieties, average cereal rye yield was 42.6 bu/ac.
- Hybrid cereal rye varieties Bono, Receptor, Serafino and Tayo were the top-yielding varieties across all sites except Greenfield, where Tulus (triticale) was the highest yielding.
- Hazlet, Danko and Aroostook were the top yielding open-pollinated varieties across all sites.

### BACKGROUND

This was the fifth year that Practical Farmers of Iowa coordinated cereal rye variety trials at Iowa State University research farms at Kanawha (north-central Iowa) and Nashua (northeast Iowa); it was the third year of trials at ISU research farms at Boone (central Iowa) and Greenfield (southwest Iowa). In 2023, we once again included one winter triticale variety (Tulus) along with 11 cereal rye varieties. In 2019, the average cereal rye yield across three sites in northern Iowa was 43 bu/ac.<sup>[1]</sup> In 2020, the average cereal rye yield across the same northern Iowa sites was 39 bu/ac.<sup>[2]</sup> In 2021, the average cereal rye yield across the four research farms was 65.3 bu/ac.<sup>[3]</sup> In 2022, the average cereal rye yield across the four research farms was 81.3 bu/ac.<sup>[4]</sup> Cereal rye variety trials conducted by the University of Minnesota reported an average yield of 92.9 bu/ac in 2022.<sup>[5]</sup>

### METHODS

Variety trials were conducted at four locations in 2023: ISU Northern Research Farm in Kanawha; ISU Northeast Research Farm in Nashua; ISU Ag Engineering and Agronomy Farm in Boone; ISU Southwest Research Farm in Greenfield. Production characteristics and some breeding history about each of the trialed varieties can be found in **Table 1** Information on winter hardiness, days to heading, plant height

and ergot susceptibility can be sourced from the University of Minnesota.<sup>[5]</sup> Rye management information is provided with the results from each location. No herbicide, insecticide or fungicide were applied at any location. Statistical significance is determined at the 90% confidence level and means separations were determined using Tukey's least significant difference (LSD).



Plots at the cereal rye variety trial at Boone on May 10, 2023.

### Cooperators

ISU Northern Research Farm  
(Matt Schnabel) – Kanawha

ISU Northeast Research  
Farm (Ken Pecinovsky) –  
Nashua

ISU Ag Engineering and  
Agronomy Farm (Matt  
Schnabel) – Boone

ISU Southwest Research  
Farm (Matt Schnabel) –  
Greenfield

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USDA-NIFA; Walton Family  
Foundation; Albert Lea Seed  
House; Green Cover; North  
Dakota State University;  
KWS

TABLE 1. Origin, characteristics and seeding rate of cereal rye and triticale varieties trialed in 2023.

VARIETY	SPECIES	ORIGIN	PVP <sup>a</sup>	TYPE	SEEDING RATE (lb/ac) <sup>c</sup>
Aroostook	Cereal rye	USDA-ARS	None	Open-pollinated	68
Bono	Cereal rye	KWS	N/A <sup>b</sup>	Hybrid	43
Danko	Cereal rye	Danko Hodowla Roślin	None	Open-pollinated	89
Elbon	Cereal rye	Oklahoma St. Univ.	None	Open-pollinated	56
Hazlet	Cereal rye	SeCan	None	Open-pollinated	75
ND Dylan	Cereal rye	North Dakota St. Univ.	PVP(94)	Open-pollinated	75
ND Gardner	Cereal rye	North Dakota St. Univ.	PVP(94)	Open-pollinated	59
Receptor	Cereal rye	KWS	N/A <sup>b</sup>	Hybrid	53
Serafino	Cereal rye	KWS	N/A <sup>b</sup>	Hybrid	41
Spooner	Cereal rye	Univ. Wisconsin	None	Open-pollinated	58
Tayo	Cereal rye	KWS	N/A <sup>b</sup>	Hybrid	45
Tulus	Triticale	Nordsaat Saatzucht GmbH, Germany	None	Open-pollinated	58

a PVP = Plant Variety Protection. The PVP Act provides a certificate to the developer of a variety granting exclusive rights for reproducing and marketing the seed.

b Hybrids from KWS are protected from propagation by license agreements entered into with KWS upon seed purchase.

c Calculated from seed lot weights (no. seeds/lb) to achieve target populations of 25 seeds/ft<sup>2</sup> (open-pollinated) and 18.4 seeds/ft<sup>2</sup> (hybrid) and assuming 92% germination.

## RESULTS AND DISCUSSION

Data were analyzed by location and reported yields are corrected for 14% moisture. A “percentage of test average” calculation for 2023 is included to aid in comparing entries at each location. The yield average is provided for varieties that were also trialed in 2019, 2020, 2021 and 2022. Rainfall and temperature data were accessed from the nearest weather station from each trial location.<sup>[6]</sup>

Across all sites and varieties, the average yield was 42.6 bu/ac in 2023, lower than the yield averages of 2022 and 2021 but similar to those in 2020 and 2019<sup>[1-4]</sup>. Precipitation in 2023 fell far below the 10-year averages at all sites. As in previous years, the highest yielding varieties across all sites and at Boone, Kanawha and

Nashua individually were Bono, Receptor, Serafino and Tayo, all hybrid varieties<sup>[4]</sup>. At Greenfield, Tulus, another hybrid variety, was the highest yielding variety and yields of other varieties were statistically similar. Yields of all varieties at Greenfield were much lower than those at the three other sites. Over the five years of variety trials, hybrid varieties have out-yielded open-pollinated varieties by about 30 bu/ac and are consistently shorter in stature as well as far less prone to lodging<sup>[4]</sup>. ND Dylan and ND Gardner, two open-pollinated varieties, were consistently the tallest varieties and suffered the most lodging at all four sites. In 2023, hybrid varieties out-yielded open-pollinated varieties by about 17 bu/ac and were on average about 12 inches shorter.

Of the seven open-pollinated cereal rye varieties trialed, Aroostook, Danko and Hazlet were the top yielding varieties across all four sites.

## ISU NORTHERN RESEARCH FARM, KANAWHA

Previous crop: Soybean  
 Replications: 3  
 Harvested plot size: 5 ft. X 60 ft.  
 Fertilizer applied: 11 lb N/ac, 52 lb P/ac and 60 lb K/ac on Oct. 24, 2022  
 46 lb N/ac on Apr. 11, 2023  
 Planting date: Sept. 30, 2022  
 Row spacing: 7.5 in.  
 Seeding rate: Open-pollinated = 25 seeds/ft<sup>2</sup>  
 Hybrid = 18.7 seeds/ft<sup>2</sup>  
 See **Table 1** for pounds per acre of each variety to reach target population.  
 Seeding depth: 1.25 in.  
 Harvest date: July 28, 2023

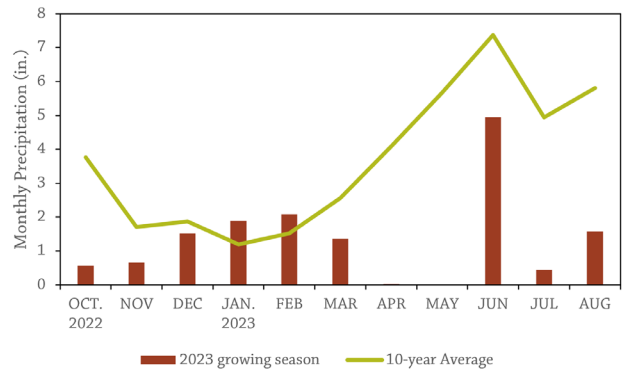
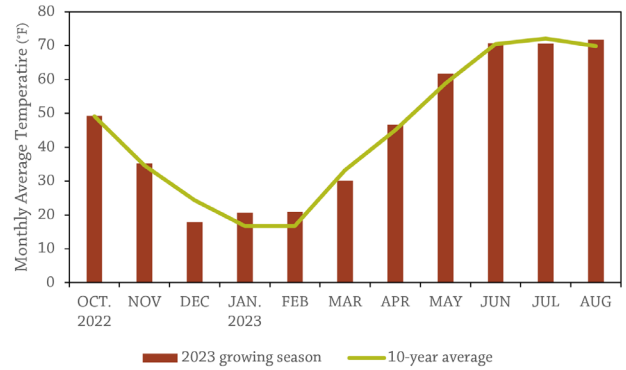


TABLE 2. 2023 Cereal Rye & Triticale Variety Trial at Kanawha in north central Iowa

VARIETY	YIELD (bu/ac)		YIELD (% of site avg.)	TEST WEIGHT (lb/bu)	PLANT HT at HARVEST (in.)	LODGING (%)
	2023	5 yr				
Aroostook	51	50	99	56	53	2
Bono	62	86	120	56	37	0
Danko	46	68	90	57	45	2
Elbon	34	43	66	56	50	27
Hazlet	47	64	92	55	49	3
ND Dylan	35	47	68	56	58	48
ND Gardner	40	57	77	55	55	43
Receptor	71	--	139	56	41	0
Serafino	68	88	133	56	41	0
Spooner	41	52	81	56	56	10
Tayo	69	--	134	56	41	0
Tulus	51	--	99	49	30	0
LSD (90%)	7	--	--	1	3	9
MEAN	51	62	--	55	46	11

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.

## ISU NORTHEAST RESEARCH FARM, NASHUA

Previous crop: Soybeans  
 Replications: 3  
 Harvested plot size: 8.125 ft x 50 ft  
 Fertilizer applied: 60 lb. P/ac and 135 lb. K/ac on November 8, 2022  
 25.25 lb. S/ac on November 23, 2022  
 30lb. N/ac on April 3 2023  
 Planting date: October 6, 2022  
 Row spacing: 7.5 in.  
 Seeding rate: Open-pollinated = 25 seeds/ft<sup>2</sup>  
 Hybrid = 18.4 seeds/ft<sup>2</sup>  
*See **Table 1** for pounds per acre of each variety to reach target population.*  
 Seeding depth: 1.25 in.  
 Harvest date: July 18, 2023

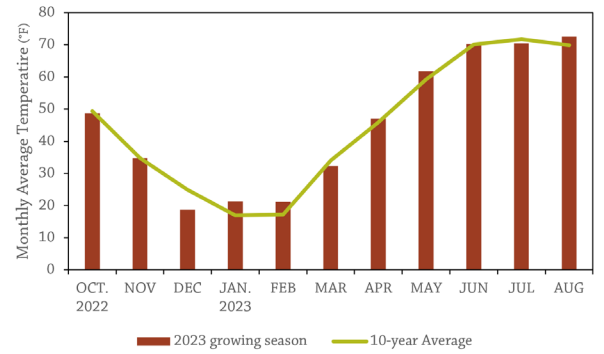


TABLE 3. 2023 Cereal Rye & Triticale Variety Trial at Nashua in northeast Iowa.

	YIELD (bu/ac)		YIELD (% of site avg.)	TEST WEIGHT (lb/bu)	PLANT HT at HARVEST (in.)	LODGING (%)	STRAW YIELD (ton/ac)
	2023	5-yr					
Aroostook	48	43	86	56	52	1	2
Bono	72	78	129	56	39	0	2
Danko	55	68	99	56	45	0	1
Elbon	41	43	74	56	54	2	2
Hazlet	53	57	94	56	50	1	2
ND Dylan	51	52	91	56	54	3	2
ND Gardner	48	58	86	56	53	3	2
Receptor	65	--	117	56	40	0	1
Serafino	68	82	122	56	41	0	2
Spooner	46	51	83	56	55	2	1
Tayo	65	--	117	55	39	0	1
Tulus	58	--	104	52	30	0	1
LSD(90%)	5	--	--	0	1	1	0
MEAN	56	59	--	56	46	1	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.

## ISU AG ENGINEERING AND AGRONOMY FARM, BOONE

Previous crop: Soybeans  
 Replications: 3  
 Harvested plot size: 60 ft. x 5 ft.  
 Fertilizer applied: 11 lb N/ac, 100 lb P/ac and 60 lb K/ac October 24, 2022  
 46 lb N/ac April 11, 2023  
 Planting date: October 18, 2022  
 Row spacing: 7.5 in  
 Seeding rate: Open-pollinated = 25 seeds/ft<sup>2</sup>  
 Hybrid = 18.4 seeds/ft<sup>2</sup>  
 See **Table 1** for pounds per acre of each variety to reach target population.  
 Seeding depth: 1.25 in.  
 Harvest date: July 26, 2023

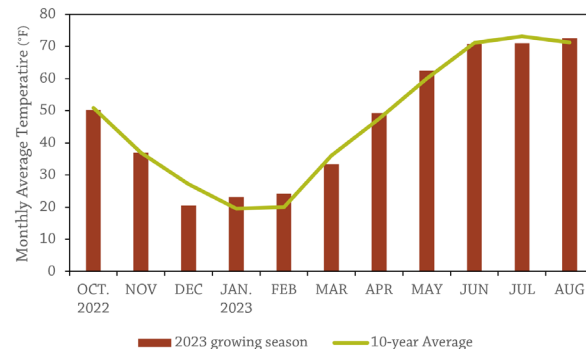


TABLE 4. 2023 Cereal Rye & Triticale Variety Trial at Boone in central Iowa.

	YIELD (bu/ac)		YIELD (% of site avg.)	TEST WEIGHT (lb/bu)	PLANT HT at HARVEST (in.)	LODGING (%)
	2023	3-yr				
Aroostook	36	46	97	55	50	37
Bono	48	68	129	56	36	0
Danko	33	52	90	55	42	3
Elbon	26	31	71	55	52	77
Hazlet	38	49	104	54	47	17
ND Dylan	33	44	89	55	53	78
ND Gardner	32	38	86	54	53	50
Receptor	49	--	131	56	37	0
Serafino	50	67	135	56	38	3
Spooner	33	43	89	55	54	25
Tayo	52	--	141	54	39	0
Tulus	45	--	122	49	33	0
LSD(90%)	6	--	--	0	5	19
MEAN	37	49	--	50	41	24

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.

## ISU SOUTHWEST RESEARCH FARM, GREENFIELD

Previous crop: Soybeans  
 Replications: 3  
 Harvested plot size: 5 ft x 50 ft  
 Fertilizer applied: 46 lb N/ac on April 3, 2023  
 Planting date: Oct. 14, 2022  
 Row spacing: 7.5 in.  
 Seeding rate: Open-pollinated = 25 seeds/ft<sup>2</sup>

Hybrid = 18.4 seeds/ft<sup>2</sup>

See **Table 1** for pounds per acre of each variety to reach target population.

Seeding depth: 1.25 in.

Harvest date: July 21, 2023

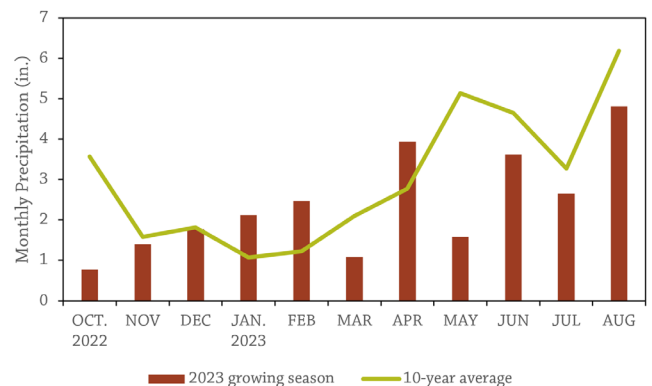
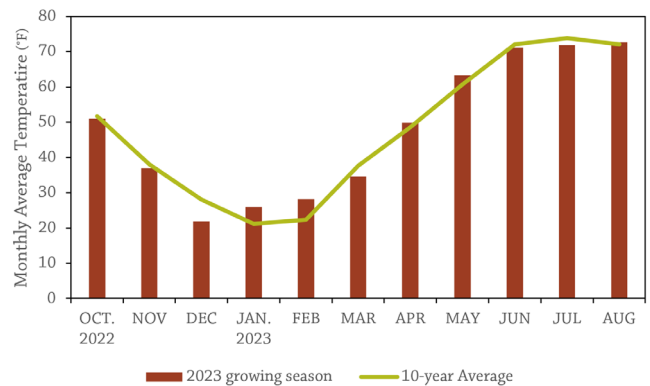


TABLE 5. 2023 Cereal Rye & Triticale Variety Trial at Greenfield in southwest Iowa.

	YIELD (bu/ac)		YIELD (% of site avg.)	TEST WEIGHT (lb/bu)	PLANT HT at HARVEST (in.)	LODGING (%)
	2023	3-yr				
Aroostook	23	51	102	55	55	22
Bono	26	75	114	56	42	13
Danko	27	61	123	55	50	22
Elbon	17	39	74	55	57	45
Hazlet	24	57	106	54	55	43
ND Dylan	23	46	101	55	63	77
ND Gardner	18	41	79	54	60	73
Receptor	26	--	117	56	46	10
Serafino	27	76	121	56	46	10
Spooner	18	44	82	55	55	18
Tayo	27	--	119	54	44	10
Tulus	32	--	141	49	37	5
LSD(90%)	5	--	--	1	3	12
MEAN	22	51	--	50	47	28

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.

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- [5] J. Wiersma, "Winter Rye Field Crop Variety Trials," 2022. <https://varietytrials.umn.edu/winter-rye> (accessed Jun. 27, 2023).
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