

# Cereal Rye Variety Trial 2019

## In a Nutshell:

- Six cereal rye varieties were screened at two Iowa State University research farms and one commercial farm.

## Key Findings:

- Hybrid varieties, Bono and Brasetto, were the top yielding varieties at each site.
- Hazlet and ND Dylan, more-recently-released open-pollinated varieties, were intermediate yield performers across sites.

## BACKGROUND

Cereal rye has recently gained attention as a winter cover crop in corn-soybean production systems. Seeded in the fall, cereal rye will grow before going into winter dormancy and resume growth early the following spring. Because cereal rye is harvested for grain in mid- to late July, field management options for the remainder of the season are numerous. These include establishment of a perennial forage or summer cover crop, as well as an opportunity for mid-season manure application. In 2019, the average cereal rye yield for Minnesota was 39 bu/ac and for Wisconsin was 34 bu/ac, according to the USDA-National Agricultural Statistics Service (no such recent data is available for Iowa). Recent cereal rye

variety trials conducted by the University of Minnesota, however, reported an average yield of 77 bu/ac.<sup>[1]</sup>

Currently most cereal rye planted as cover crop in Iowa is VNS. As farmers begin to plant cereal rye for other purposes – cover crop seed, grain, straw, forage, hay or haylage production – they might seek to plant cereal rye varieties with distinct production characteristics. The 2019 Cereal Rye Variety Trial reports on some of these characteristics with Iowa-specific growing conditions.

## METHODS

Variety trials were conducted at three locations in 2019: ISU Northern Research Farm in Kanawha; ISU Northeast Research Farm in

Nashua; Wendy Johnson's farm in Charles City. 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 was sourced from the University of Minnesota.<sup>[1]</sup>

Rye management information is provided with the results from each location. No herbicide, insecticide or fungicide were applied at any location. Data were analyzed using JMP Pro 13 (SAS Institute Inc., Cary, NC). Statistical significance is determined at  $P \leq 0.05$  level and means separations are reported using Tukey's least significant difference (LSD).

## Cooperators

Matt Schnabel (ISU Northern Research Farm) – Kanawha

Ken Pecinovsky (ISU Northeast Research Farm) – Nashua

Wendy Johnson – Charles City

## Funding

Walton Family Foundation  
 Albert Lea Seed House

**TABLE 1. Characteristics of cereal rye varieties screened in 2019.**

VARIETY	ORIGIN <sup>a</sup>	YEAR OF RELEASE	PVP <sup>b</sup>	TYPE <sup>c</sup>	WINTER HARDINESS <sup>d</sup>	TIME TO HEADING <sup>e</sup>	PLANT HEIGHT <sup>f</sup>	ERGOT RESISTANCE <sup>g</sup>
Aroostook	USDA-NRCS	1981	None	OPV	1	1	6	4
Bono	KWS	2013	None	Hybrid <sup>h</sup>	4	6	1	1
Brasetto	KWS	2007	None	Hybrid <sup>h</sup>	3	7	2	1
Elbon	OK	1956	None	OPV	9	1	5	5
Hazlet	SeCan	2006	None	OPV	4	7	4	1
ND Dylan	ND	2016	Pending	OPV	5	6	7	2

<sup>a</sup> Origin: OK – Oklahoma State University; ND – North Dakota State University.

<sup>b</sup> 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.

<sup>c</sup> OPV = Open Pollinated Variety.

<sup>d</sup> 1 = most hardy; 9 = least hardy. Ratings are average of 2016–2018 trials at University of Minnesota.

<sup>e</sup> 1 = earliest; 9 = latest. Ratings are average of 2016–2018 trials at University of Minnesota.

<sup>f</sup> 1 = shortest; 9 = tallest. Ratings are average of 2016–2018 trials at University of Minnesota.

<sup>g</sup> 1 = most resistant; 9 = least resistant. Ratings are average of 2016–2018 trials at University of Minnesota.

<sup>h</sup> Hybrids from KWS are protected from propagation by license agreements entered into with KWS upon seed purchase.

## RESULTS AND DISCUSSION

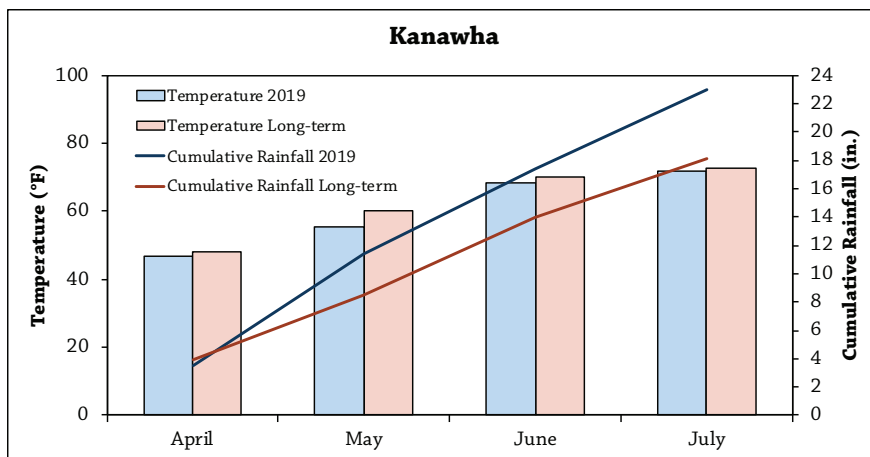
Data were analyzed by location and varieties are listed in order of 2019 yield performance. Reported yields are corrected for 13% moisture. A “percentage of test average” calculation for 2019 is included to aid in comparing among entries at each location. Rainfall and temperature data were either provided from the farm manager or accessed from the nearest weather station.<sup>[2]</sup>

The hybrid varieties, Bono and Brasetto, were the top yield performers at each location. The hybrids were also significantly shorter in stature than the open-pollinated varieties. The newer open-pollinated varieties, Hazlet and ND Dylan, were intermediate in terms of yield at each location.

### ISU NORTHERN RESEARCH FARM, KANAWHA

Previous crop: Soybeans  
 Replications: 3  
 Plot size: 10 ft × 60 ft  
 Fertilizer applied: 144 lb K/ac as potash on Nov. 13, 2018  
 25 lb N/ac and 116 lb P/ac as MAP on Nov. 14, 2018  
 Planting date: Oct. 26, 2018 with no-till drill  
 Row spacing: 7.5 in.  
 Seeding rate: 23 seeds/ft<sup>2</sup>  
 Rate on weight basis to achieve target population:  
 Aroostook (74 lb/ac)  
 Bono (84 lb/ac)  
 Brasetto (93 lb/ac)  
 ND Dylan (70 lb/ac)  
 Hazlet (82 lb/ac)  
 Elbon (51 lb/ac)

Seeding depth: 1.25 in.  
 Harvest date: July 26, 2019



VARIETY	YIELD (bu/ac)	YIELD (% of site avg.)	TEST WEIGHT (lb/bu)	PLANT HEIGHT AT HARVEST (in.) <sup>b</sup>	% LODGING AT HARVEST <sup>b</sup>
Bono	77	160	54	47	0
Brasetto	70	146	52	48	0
Hazlet	45	94	53	58	5
ND Dylan	40	83	51	63	3
Elbon	25	52	52	58	3
Aroostook	23	48	51	62	5
<b>MEAN</b>	48	--	52	56	3
<b>LSD(0.05)<sup>a</sup></b>	20	--	1	--	--

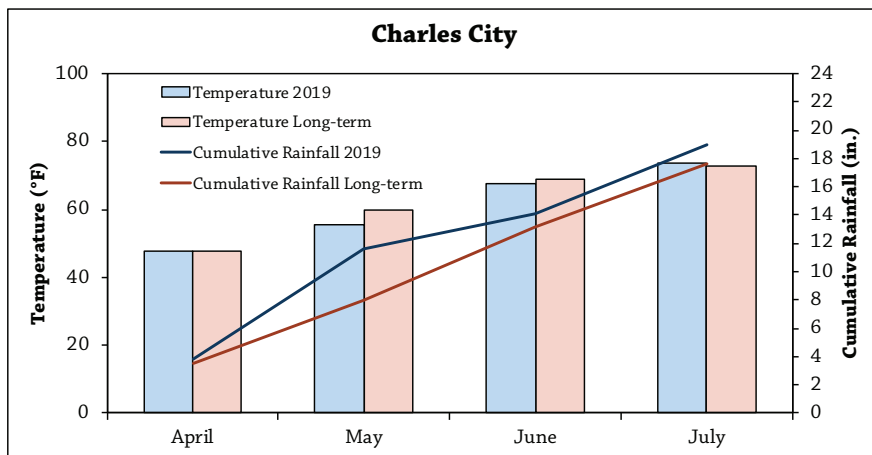
<sup>a</sup> By response variable, if the difference between any two entries is greater than the least significant difference (LSD) the entries are considered statistically different with 95% confidence.

<sup>b</sup> Take caution. Too much variability and experimental error precluded statistical analysis of plant height and lodging data.

## WENDY JOHNSON'S FARM, CHARLES CITY

Previous crop: Soybeans  
 Replications: 3  
 Plot size: 10 ft × 60 ft  
 Fertilizer applied: None  
 Planting date: Oct. 24, 2018 with no-till drill  
 Row spacing: 7.5 in.  
 Seeding rate: 23 seeds/ft<sup>2</sup>  
 Rate on weight basis to achieve target population:  
     Aroostook (74 lb/ac)  
     Bono (84 lb/ac)  
     Brasetto (93 lb/ac)  
     ND Dylan (70 lb/ac)  
     Hazlet (82 lb/ac)  
     Elbon (51 lb/ac)

Seeding depth: 1.25 in.  
 Harvest date: Aug. 2, 2019



**TABLE 3. Results for the 2019 Cereal Rye Variety Trial at Charles City in north-central Iowa.**

VARIETY	YIELD (bu/ac)	YIELD (% of site avg.)	TEST WEIGHT (lb/bu)	PLANT HEIGHT AT HARVEST (in.)	% LODGING AT HARVEST
Bono	63	180	54	45	3
Brasetto	55	157	53	46	3
Hazlet	31	89	54	55	25
ND Dylan	28	80	54	61	58
Aroostook	18	51	53	58	63
Elbon	13	37	53	68	82
<i>MEAN</i>	35	--	54	54	39
<i>LSD(0.05)<sup>a</sup></i>	11	--	2	6	18

<sup>a</sup> 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 95% confidence.

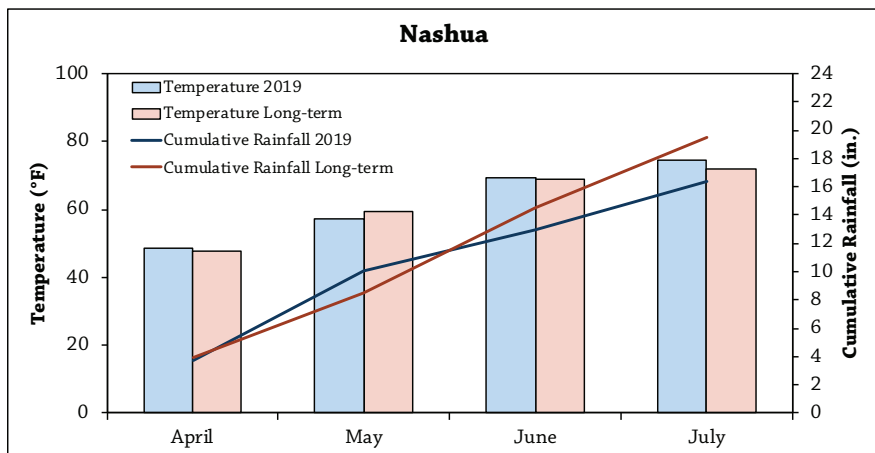
## ISU NORTHEAST RESEARCH FARM, NASHUA

Previous crop: Soybeans  
 Replications: 3  
 Plot size: 10 ft × 60 ft  
 Fertilizer applied: 60 lb P/ac as TSP and 267 lb K/ac as potash on Nov. 13, 2018  
 Planting date: Oct. 25, 2018 with no-till drill  
 Row spacing: 7.5 in.  
 Seeding rate: 23 seeds/ft<sup>2</sup>  
 Rate on weight basis to achieve target population:  
     Aroostook (74 lb/ac)  
     Bono (84 lb/ac)  
     Brasetto (93 lb/ac)  
     ND Dylan (70 lb/ac)  
     Hazlet (82 lb/ac)  
     Elbon (51 lb/ac)

Seeding depth: 1.25 in.  
 Harvest date: July 23, 2019



Cereal rye variety trial plots at the ISU Northeast Research Farm in Nashua on June 26, 2019.



**TABLE 4. Results for the 2019 Cereal Rye Variety Trial at Nashua in northeast Iowa.**

VARIETY	YIELD (bu/ac)	YIELD (% of site avg.)	TEST WEIGHT (lb/bu)	PLANT HEIGHT ON JULY 19 (in.)	% LODGING ON JULY 19
Bono	62	138	54	40	0
Brasetto	57	127	53	39	0
Hazlet	43	96	54	53	0
ND Dylan	43	96	53	52	3
Aroostook	35	78	53	53	7
Elbon	32	71	53	49	13
MEAN	45	--	53	48	4
LSD(0.05) <sup>a</sup>	6	--	1	4	5

<sup>a</sup> 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 95% confidence.

## CONCLUSIONS AND NEXT STEPS

Desired cereal rye characteristics vary depending on intended purpose of the crop. For instance, if harvesting grain for livestock feed was the main priority in planting cereal rye, high-yielding hybrid varieties such as Bono and Brassetto might be optimal choices. If the intended purpose is haylage, the varieties ND Dylan or Aroostook, with their tall plant height, might be preferable to the shorter hybrids. In contrast, if someone were growing a cereal rye crop for cover crop seed to be used on their own farm, they would avoid hybrid varieties and seek high yield with little lodging. Farmers intending to sell cereal rye seed for cover crops to be sold off their farm need to be familiar with intellectual property considerations and the licensing process for those varieties with plant variety protection.

With the compiled information on plant protection status, winter hardiness, days to heading, plant height, and ergot susceptibility, alongside the researched characteristics of yield, test weight, plant height, and percent lodging, a farmer in Iowa can determine which cereal rye variety will best meet their production goals.

## REFERENCES

1. Wiersma, J., S. Wells, A. Garcia y Garcia, D. Grafstrom, H. Lindell and S. Quiring. 2018. 2018 Winter Rye Field Crop Trials Results. University of Minnesota. [https://www.maes.umn.edu/sites/maes.umn.edu/files/2018\\_winter\\_rye\\_final.pdf](https://www.maes.umn.edu/sites/maes.umn.edu/files/2018_winter_rye_final.pdf) (accessed October 2019).
2. Iowa Environmental Mesonet. 2019. Climodat Reports. Iowa State University. <http://mesonet.agron.iastate.edu/climodat/> (accessed October 2019).



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