

## Oat Variety Trial 2024

### In a Nutshell:

- 16 oat varieties were screened at four Iowa State University research farms.

### Key Findings:

- Across varieties and sites, average oat yield was 125 bu/ac and average test weight was 36 lb/bu.
- Saddle scored the highest grain yield, Antigo scored the highest test weight.

### BACKGROUND

Oats have low input requirements and beneficial effects on succeeding crops in a rotation. They can be used for grain and straw production, as a companion crop to establish hay and pastures, or for early-season forage as hay or haylage. Because of their relatively short growing season, oat production opens up numerous field management options for the remainder of the season. Perhaps reflecting these benefits, oat production has increased in Iowa in recent years. In 2024, 210,000 acres of oats were planted in Iowa, according to the USDA-National Agricultural Statistics Service [1]. This is up from 200,000 acres in 2023, and above other recent plantings of 130,000 acres in 2022, and 180,000 acres in 2021. Furthermore, 120,000 acres were harvested in 2024 (57%), up from 95,000 acres harvested in 2023 (47%). The average yield in Iowa in 2024 was 86 bu/ac; the average yield of the previous 3 years was 76 bu/ac [1].

Oat grain and straw yield and attributes, like lodging propensity, can vary by variety and growing conditions. This means that oat variety trials at sites across the state are important tools for farmers who grow oats. Since 2015, PFI has helped organize oat and other small grains variety trials at Iowa State research farms around the state, and four sites participated this year.

### METHODS

Variety trials were conducted at four locations in 2024: ISU Northern Research Farm in Kanawha; ISU Ag Engineering and Agronomy Farm in Boone; ISU Northeast Research Farm in Nashua; and ISU Southwest Research Farm in Greenfield. These variety trials build on previous trials conducted at Kanawha, Charles City, Boone, Nashua and Greenfield from 2015–2023 [2 - 10]. Information about each of the varieties trialed in 2024 can be found in **Table 1**.

Oat management information is provided with the results from each location. No herbicides or insecticides were applied at any location during the oat growing season. Statistical significance is determined at 90% confidence level and means separations are reported using Tukey's least significant difference (LSD). Data were analyzed by location, and varieties are listed in alphabetical order at each location. Reported yields are corrected for 13% moisture. Rainfall and temperature data were modeled for the site location from NASA weather data by the NASA-power climatology R package [11], [12].

### Cooperators

ISU Northern Research Farm—  
Kanawha (Matt Schnabel)

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

ISU Northern Research Farm—  
Nashua (Ken Pecinovsky)

ISU Southwest Research Farm—  
Greenfield (Matt Schnabel)

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SDSU Seed Foundation

UW Foundation Seeds

Zabel Seeds



Heads of oats just before harvest.

TABLE 1: Origin, PVP and disease ratings for oat varieties trialed in 2024.

VARIETY	ORIGIN <sup>a</sup>	YEAR RELEASED	PVP <sup>b</sup>	MATURITY	DISEASE RATINGS <sup>c</sup>			
					CROWN RUST	STEM RUST	BYDV <sup>d</sup>	SMUT
Antigo	WI	2017	PVP	Early	MR	S	MR	MR
Esker 2020	WI	2020	PVP	Medium	MR	MR	MR	R
Goliath	SD	2013	PVP	Late	MS	R	MR	MR
Hayden	SD	2015	PVP	Med-Late	MS	MS	MR	R
Jerry	ND	1994	PVP	Medium	MS	MS	MS	MS
Mink	WI	2022	PVP	Late	MR	R	R	--
MN Pearl	MN	2018	PVP	Late	MR	MR	MS	R
Morton	ND	2001	PVP	Late	MR	MR	MS	R
Reins	IL	2016	PVP	Early	MR	MR	R	R
Rushmore	SD	2019	PVP	Medium	MR	--	MR	MR
Saddle	SD	2018	PVP	Early	MR	S	MR	R
Shelby 427	SD	2011	PVP	Medium	MS	MS	MR	MR
SD Buffalo	SD	2022	PVP	Medium	R	MR	MR	--
SD Momentum	SD	2024	PVP	Med-Late	R	--	MR	R
Sumo	SD	2017	PVP	Early	MR	R	MS	R
Warrior	SD	2019	PVP	Med-Late	R	--	MS	R

<sup>a</sup> Origin: IL-University of Illinois; MN-University of Minnesota; ND-North Dakota State University; SD-South Dakota State University; WI-University of Wisconsin.

<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> Disease Ratings: S = susceptible; MS = moderately susceptible; MR = moderately resistant; R = resistant.

<sup>d</sup> Disease: BYDV = Barley Yellow Dwarf Virus.

## RESULTS AND DISCUSSION

Rainfall in 2024 was above 10-year averages at all sites during the oat growing season. Recent years had been affected by drought, but those trends were reversed by the large amounts of rain that fell in the spring and early summer of 2024 [13].

Compared to U.S. national (75 bu/ac) and state of Iowa (86 bu/ac) average yields, all four ISU sites had much higher yields [1]. Furthermore, 2024 yields were generally higher than the three-year averages (2022-2024) from the same sites (**Tables 2-5**). Across all sites, the five highest-yielding varieties were Saddle (151 bu/ac), Rushmore and MN Pearl (both 136 bu/ac), and Warrior and Reins (both 134 bu/ac). Saddle was the run-away yield champion, yielding significantly more than any other variety across all sites. At individual sites, these five varieties tended to be among the highest yielding varieties, but this difference was not consistently statistically significant. Goliath (97 bu/ac) and Antigo (108 bu/ac) were the lowest-yielding varieties, although Antigo consistently scored the highest test weight, averaging 38 lb/bu.

Compared to the previous three years at the ISU sites, test weights were higher in 2024. The standard minimum test weight that many companies require for food grade oats is 38 lb/bu. All sites had at least one variety reach the food-grade threshold, and Nashua and Greenfield each had six varieties that reached

this threshold. This is a reversal of the general pattern from the last three years of tests at ISU sites, which have had Nashua and Greenfield underperforming in terms of number of varieties reaching food-grade test weight, compared with Kanawha and Boone. This could be because the previous three summers in Iowa have been dry, while 2024 was wet. Kanawha had the lowest average test weight and had only one variety (Antigo) reach food-grade test weight, but it had the highest average yield across varieties. Kanawha had the longest period between seeding and harvest (140 days).

Boone had the lowest average yield of all the sites, and only two varieties (Shelby and SD Momentum) reached food quality test weight at Boone. These relatively poor results may be attributable to the massive incidence of lodging there: 80% of all the oat plants grown there during this trial were assessed to have lodged. The late harvest (Boone was the only site harvested in August) probably contributed to the high rate of lodging.

Rushmore was the best all-around performing variety, producing the second highest yields (average 136 bu/ac), tying for the highest test weights (38 lb/bu), and reaching the food-grade standard at both the Nashua and Greenfield test sites. It was also the third-highest straw-producing variety (2.2 tons/ac) at Nashua, the only site that measured straw yields. PFI plans to continue oat variety trials in future years at ISU research farms.

**ISU NORTHERN RESEARCH FARM, KANAWHA**

Previous crop: Soybeans  
 Replications: 3  
 Harvested plot size: 5 ft x 47 ft  
 Fertilizer applied: 35 lb/ac N as UAN on March 12, 2024

Planting date: March 12, 2024  
 Row spacing: 7.5 in.  
 Seeding rate: 4 bu/ac  
 Seeding depth: 1 in.  
 Harvest date: July 30, 2024

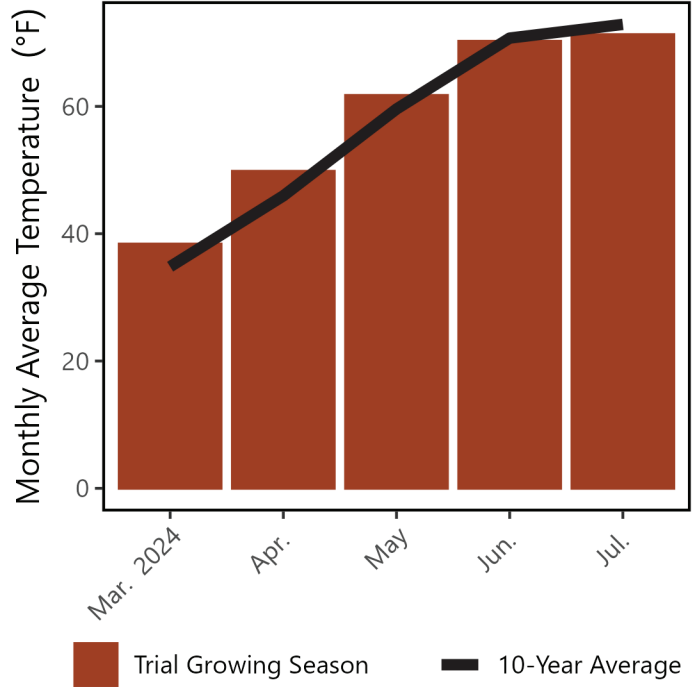
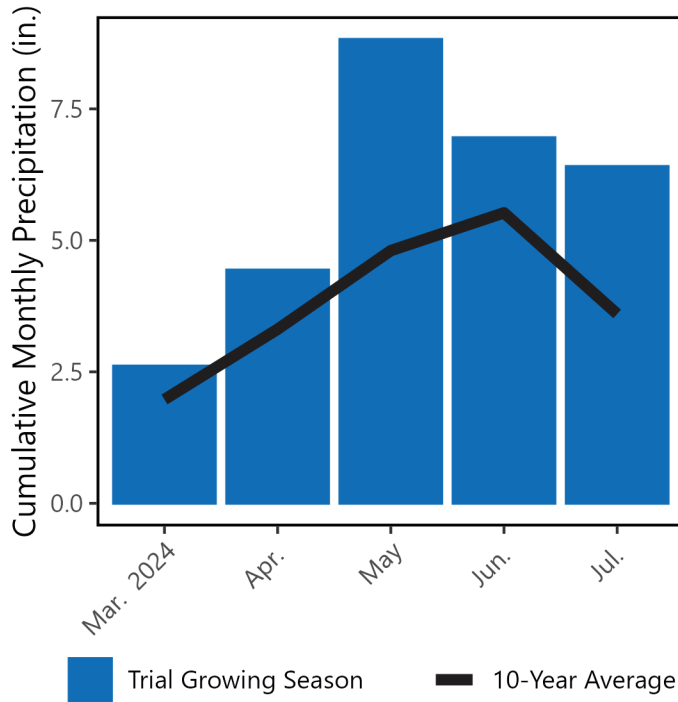


TABLE 2. 2024 Oat Variety Trial at Kanawha in north-central Iowa.  
 Varieties with a test weight that meets food grade specification ( $\geq 38$  lb/bu) are highlighted.

VARIETY	YIELD			TEST WEIGHT (lb/bu)	PLANT HT at HARVEST (in.)	LODGING (%)
	2024 (bu/ac)	% of 2024 site avg.	3-yr avg. <sup>b</sup> (bu/ac)			
Antigo	113	80%	124	38	41	48
Esker 2020	81	58%	142	33	51	65
Goliath	154	109%	114	35	49	20
Jerry	164	116%	140	37	36	20
Mink	149	106%	--	33	49	7
MN Pearl	124	88%	150	34	50	0
Morton	158	112%	124	37	36	8
Reins	148	105%	151	37	45	33
Rushmore	182	129%	154	36	41	3
Saddle	140	99%	160	35	48	2
Shelby 427	144	102%	132	36	45	33
SD Buffalo	152	107%	146	31	43	68
SD Momentum	129	92%	--	35	54	5
Sumo	129	91%	120	36	43	20
Warrior	162	115%	139	33	45	15
Mean	141		140	35	45	22
LSD (90%) <sup>a</sup>	36	--	--	2	2	16

<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 90% confidence. Jerry and Esker 2020 excluded from LSD calculations, missing reps (lost 1 Esker, 2 Jerry reps).

<sup>b</sup> Average yield of each variety from the past three years at Kanawha, including 2024. '--' indicates a variety with less than a three-year history.

**ISU AG ENGINEERING AND AGRONOMY FARM, BOONE**

Previous crop: Soybeans  
 Replications: 3  
 Harvested plot size: 13.5 ft x 48 ft  
 Fertilizer applied: 39 lb N/ac; 100 lb P/ac; 40 lb K/ac;  
 37 lb S/ac on Apr. 10, 2024

Planting date: April 10, 2024  
 Row spacing: 7.5 in.  
 Seeding rate: 4 bu/ac  
 Seeding depth: 1 in.  
 Harvest date: Aug. 8, 2024

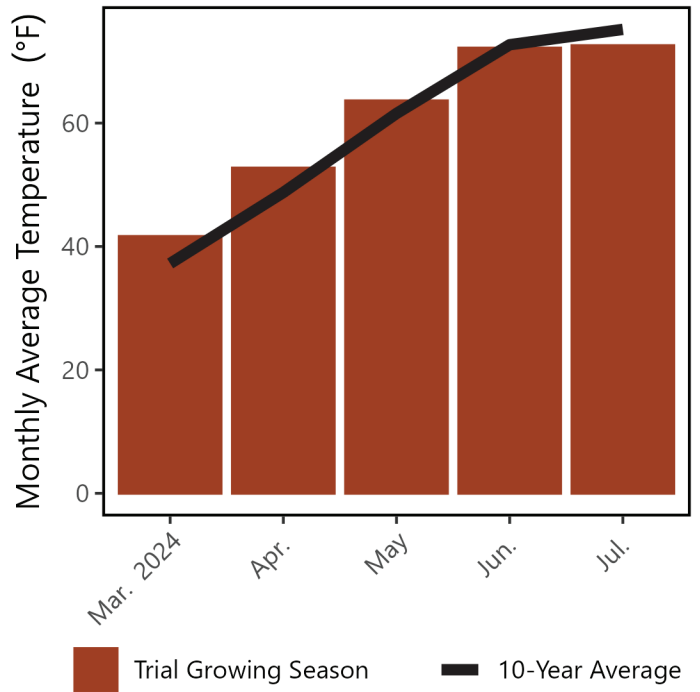
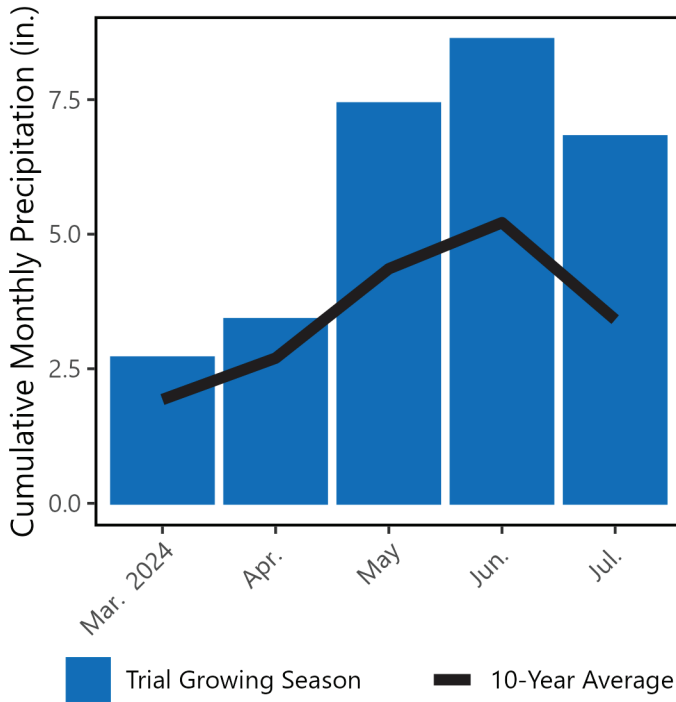


TABLE 3. 2024 Oat Variety Trial at Boone in central Iowa.

Varieties with a test weight that meets food grade specification ( $\geq 38$  lb/bu) are highlighted.

VARIETY	YIELD			TEST WEIGHT (lb/bu)	PLANT HT at HARVEST (in.)	LODGING (%)
	2024 (bu/ac)	% of 2024 site avg.	3-yr avg. <sup>b</sup> (bu/ac)			
Antigo	103	90%	124	37	33	100
Esker 2020	118	102%	131	36	34	100
Goliath	121	105%	131	37	43	98
Jerry	113	98%	129	37	36	98
Mink	98	85%	--	37	26	58
MN Pearl	127	110%	129	37	35	80
Morton	112	97%	119	36	40	85
Reins	111	96%	131	37	31	83
Rushmore	122	105%	136	37	35	75
Saddle	134	116%	65	37	32	40
Shelby 427	113	97%	119	38	36	93
SD Buffalo	120	104%	137	36	35	62
SD Momentum	115	100%	--	38	45	63
Sumo	110	95%	115	37	37	95
Warrior	117	101%	127	35	31	62
Mean	116	--	--	37	35	80
LSD (90%) <sup>a</sup>	17	--	--	1	4	26

<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 90% confidence.

<sup>b</sup> Average yield of each variety from the past three years at Boone, including 2024. '--' indicates a variety with less than a three-year history.

**ISU NORTHEAST RESEARCH FARM, NASHUA**

Previous crop: Soybeans  
 Replications: 3  
 Harvested plot size: 8.125 ft x 125 ft  
 Fertilizer applied: 30 lb N/ac as urea on March 7, 2024  
 Tillage: Field cultivator to incorporate urea on March 11, 2024

Planting date: March 11, 2024, followed by cultipacking  
 Row spacing: 7.5 in.  
 Seeding rate: 4 bu/ac  
 Seeding depth: 1.5 in.  
 Harvest date: July 19, 2024 (grain) followed by July 22, 2024 (straw)

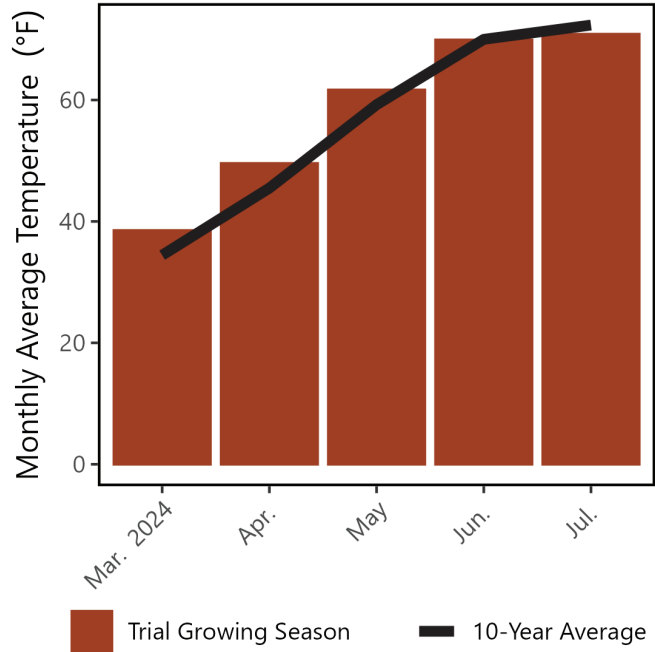
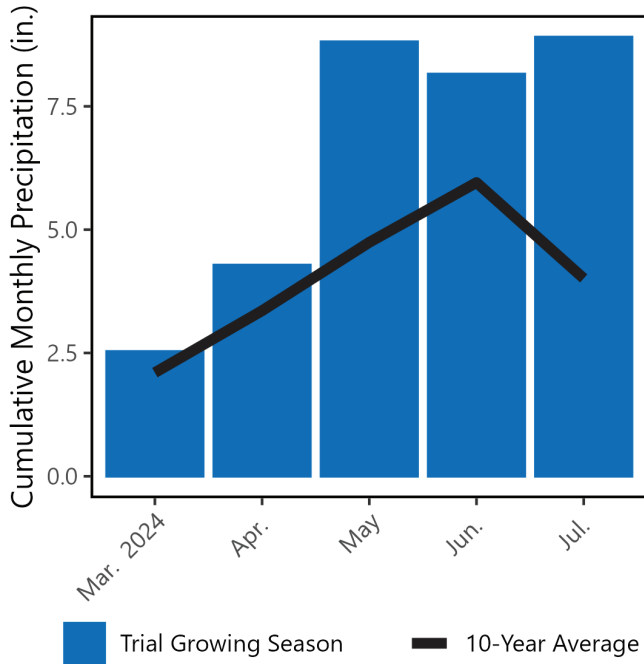


TABLE 4. 2024 Oat Variety Trial at Nashua in northeast Iowa. Varieties with a test weight that meets food grade specification ( $\geq 38$  lb/bu) are highlighted.

VARIETY	YIELD			TEST WEIGHT (lb/bu)	PLANT HT at HARVEST (in.)	LODGING (%)	STRAW YIELD (ton/ac)
	2024 (bu/ac)	% of 2024 site avg.	3-yr avg. <sup>b</sup> (bu/ac)				
Antigo	119	93%	116	38	40	2	1.5
Esker 2020	148	116%	130	34	42	4	1.6
Goliath	120	94%	113	37	53	0	2.1
Hayden	130	102%	129	37	43	0	1.7
Jerry	102	79%	116	35	44	0	1.2
Mink	112	87%	--	38	35	0	1.6
MN Pearl	139	108%	128	34	43	0	1.7
Morton	108	84%	112	35	45	0	2.2
Reins	133	104%	132	37	35	0	1.7
Rushmore	154	120%	135	38	41	0	2.2
Saddle	147	115%	135	35	40	0	2.0
Shelby 427	132	103%	119	38	42	0	2.2
SD Buffalo	137	107%	137	36	45	0	2.1
SD Momentum	120	93%	--	35	52	0	2.4
Sumo	119	92%	110	38	41	0	1.9
Warrior	132	103%	126	36	38	0	1.8
Mean	128	--	--	36	42	0	1.9
LSD (90%) <sup>a</sup>	11	--	--	0.4			

<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 90% confidence.

<sup>b</sup> Average yield of each variety from the past three years at Nashua, including 2024. '--' indicates a variety with less than a three-year history.



**ISU SOUTHWEST RESEARCH FARM, GREENFIELD**

Previous crop: Soybeans  
 Replications: 3  
 Harvested plot size: 5 ft x 50 ft  
 Fertilizer applied: 35 lb N/ac as urea on March 12, 2024  
 Tillage: Incorporated urea with disk

Planting date: March 13, 2024  
 Row spacing: 7.5 in.  
 Seeding rate: 4 bu/ac  
 Seeding depth: 1.5 in.  
 Harvest date: July 17, 2024

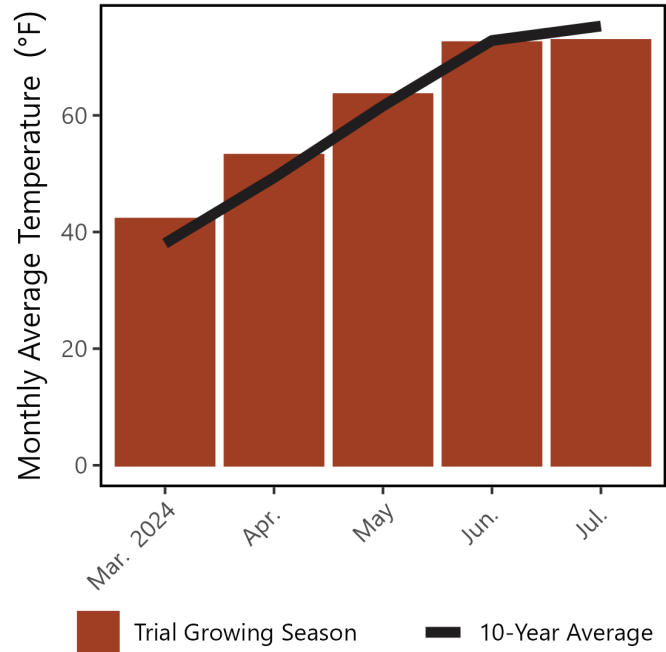
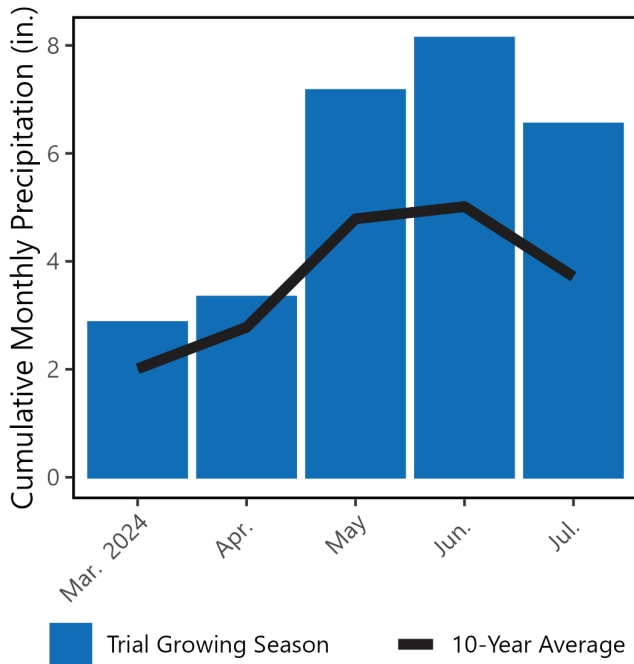


TABLE 5. 2024 Oat Variety Trial at Greenfield in southwest Iowa.  
 Varieties with a test weight that meets food grade specification ( $\geq 38$  lb/bu) are highlighted.

VARIETY	YIELD			TEST WEIGHT (lb/bu)	PLANT HT at HARVEST (in.)	LODGING (%)
	2024 (bu/ac)	% of 2024 site avg.	3-yr avg. <sup>b</sup> (bu/ac)			
Antigo	97	84%	96	39	41	63
Esker 2020	112	98%	104	34	44	57
Goliath	68	59%	77	35	56	87
Jerry	120	104%	94	36	48	22
Mink	124	108%	--	39	39	13
MN Pearl	130	113%	104	34	46	5
Morton	103	89%	88	35	57	8
Reins	132	115%	109	39	42	7
Rushmore	122	106%	108	38	46	18
Saddle	143	124%	125	36	45	2
Shelby 427	112	97%	99	38	46	48
SD Buffalo	128	112%	116	35	49	7
SD Momentum	101	87%	--	35	58	33
Sumo	109	95%	86	39	47	47
Warrior	126	109%	110	35	44	7
Mean	115	--	--	36	47	28
LSD (90%) <sup>a</sup>	13	--	--	2	3	26

<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 90% confidence.

<sup>b</sup> Average yield of each variety from the past three years at Greenfield, including 2024. '--' indicates a variety with less than a three-year history.

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