

## 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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Welter Seed and Honey Co.

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 × 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

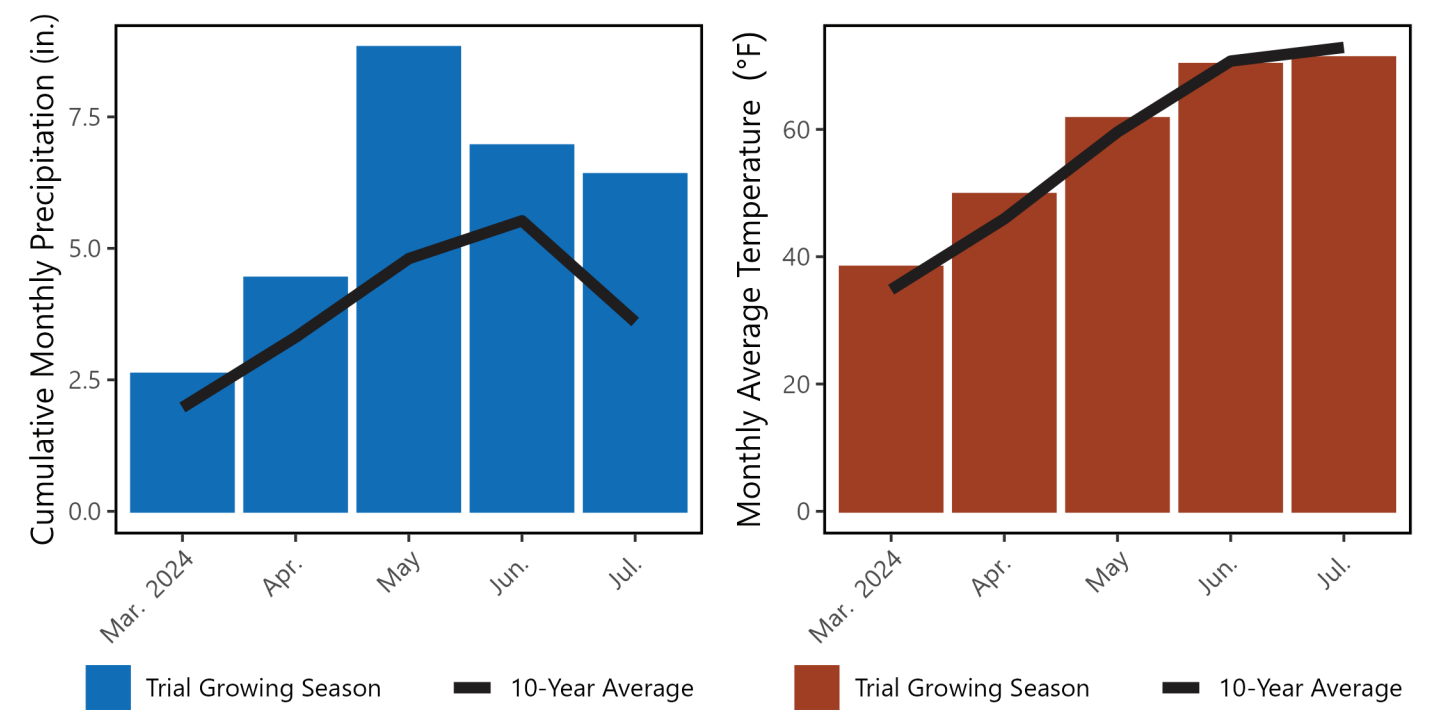


TABLE 2. 2024 Oat Variety Trial at Kanawha in north-central Iowa.  
Varieties with a test weight that meets food grade specification ( $\geq 38$  lb/bu) are highlighted.

| 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 × 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

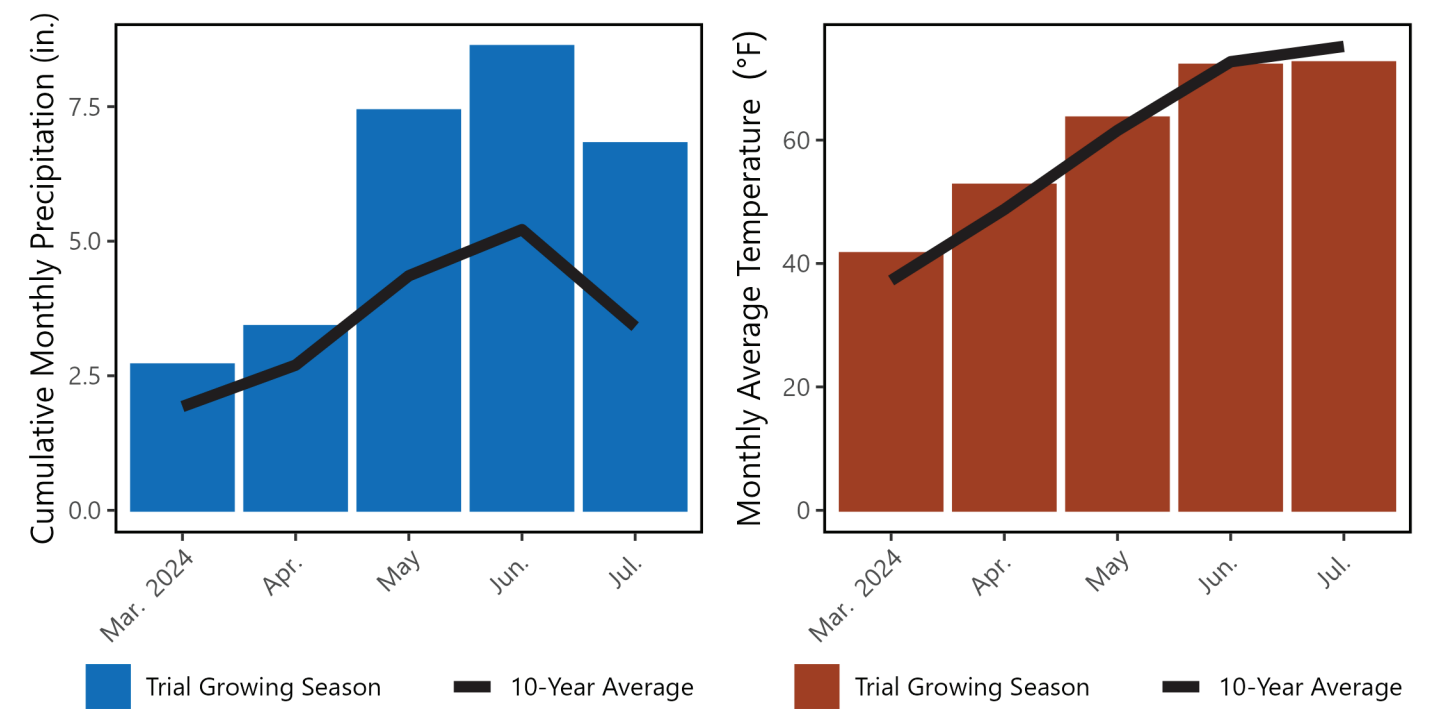


TABLE 3. 2024 Oat Variety Trial at Boone in central Iowa.  
Varieties with a test weight that meets food grade specification ( $\geq 38$  lb/bu) are highlighted.

| 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)

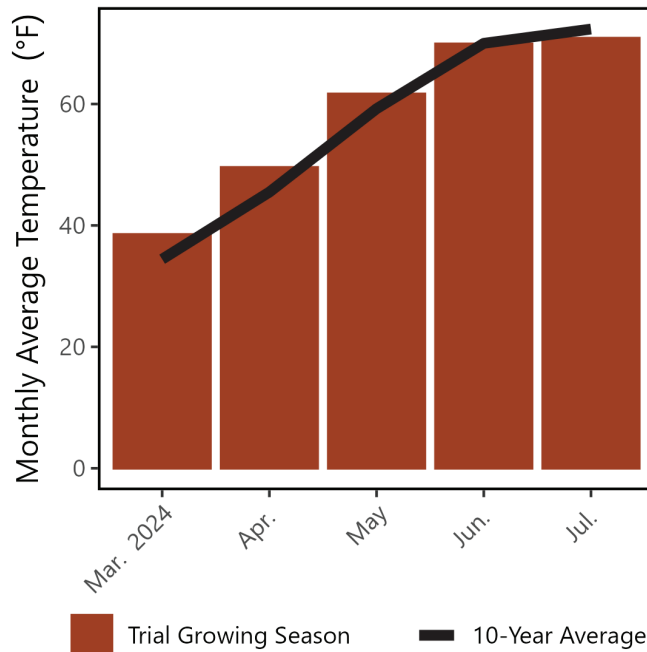
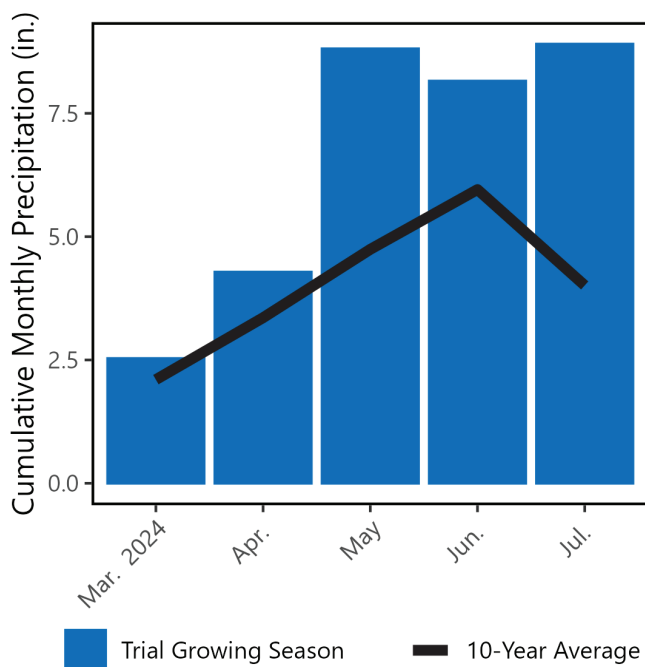


TABLE 4. 2024 Oat Variety Trial at Nashua in northeast Iowa.  
 Varieties with a test weight that meets food grade specification ( $\geq 38$  lb/bu) are highlighted.

| 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 × 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

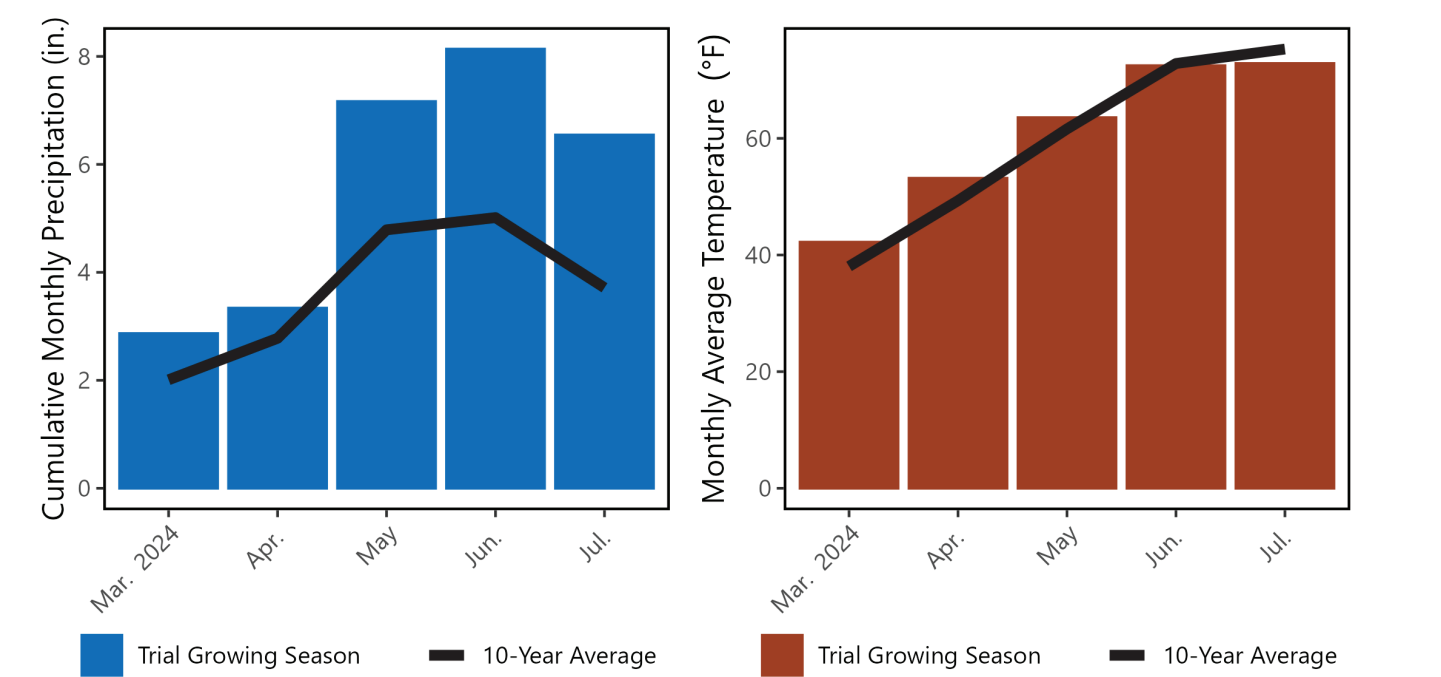


TABLE 5. 2024 Oat Variety Trial at Greenfield in southwest Iowa.  
Varieties with a test weight that meets food grade specification ( $\geq 38$  lb/bu) are highlighted.

| 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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