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# Wheat Variety Test Results for South Central Kansas - 2021

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## Abstract

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## Keywords

Grain yield, wheat yield, wheat production, winter wheat




## Cover Page Footnote

These data are part of the 2021 South Central Kansas Extension Wheat Plots, a collaboration of K-State Research and Extension County Agriculture Agents in Sedgwick, Sumner, Harvey, Harper, and Cowley County with the help of K-State Extension Specialists. Each trial is hosted by a local cooperating farmer who provides chemicals and tillage operations, if applicable. Our cooperating farmers for 2021 were Kohls Farm (Clearwater), Doug Hisken (Belle Plaine), Tim Turek (Caldwell), Davis Farms (Harper), Ken Bryant (Arkansas City), Greg Neville (Andale), and Stan Jost (Sedgwick).


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# Wheat Variety Test Results for South Central Kansas - 2021

*J. Seiler, R. Hein, R. Flaming, J. Carr, K. Nordyke, R. Lollato, and B. Pedreira*

## Summary

South central Kansas is an important winter wheat production area in the state. This report summarizes the results of winter wheat variety tests for 2020-2021 in five locations.

## Introduction

Variety selection is one of the most important steps in assuring the success of a wheat crop. In 2021, Kansas was again the highest producing wheat state in the country. The main wheat production region of the state, south central Kansas, experiences great weather variability (Lollato et al., 2020). For this reason, coupled with the different variety-specific agronomic and genetic traits and area of adaptation (Sciarresi et al., 2019), wheat varieties can yield differently in response to the environment (Jaenisch et al., 2021; Munaro et al., 2020) and soil characteristics (Lollato et al., 2019). This variability determines if, what, and/or when the crop will face yield-limiting factors such as drought, extreme temperatures, disease, weeds, insects, and nutrient issues, along with others. Thus, regional variety tests can be helpful in supporting growers' decision-making process. Data from these trials can help producers choose varieties that will perform well in their fields, as well as improve management and variety-selection recommendations (Munaro et al., 2020).

## Procedures

The South Central Kansas Extension Wheat Variety Tests were conducted in seven replicated trials in five locations in south central Kansas: Clearwater (Sedgwick Co.), Belle Plaine and Caldwell (Sumner Co.), Harper (Harper Co.), and Arkansas City (Cowley Co.). The same 30 varieties were tested at each location.

Tillage practices and chemical applications were consistent with the host field and managed by the cooperating grower. The trials in Clearwater and Belle Plaine were no-till; minimum tillage in Caldwell and Arkansas City; and conventional till in Harper. All five locations received a fungicide application and were non-irrigated.

Plots were six, 9-in. wide rows, about 30-ft long, and were sown using a Hege plot drill. The locations, planted in the first week of October, were drilled at 1.2 million seeds/a: Clearwater (10/5/20), Harper (10/5/20), Belle Plaine (10/6/20), and Arkansas City

(10/6/20). Drilling in Caldwell was delayed due to a lack of soil moisture. This location was drilled on November 9. The seeding rate was increased to 1.4 million seeds/a to compensate for later planting which usually decreases yield environment (Bastos et al., 2020). All trial locations were harvested on June 18, 2021.

The study was established as a randomized complete block design with three replications and 30 varieties. All 30 varieties in a location were managed similarly and were recommended varieties for the area. Common management practices for the region were used. The 30 varieties had a range of yield potentials, maturities, abiotic tolerances, disease resistances/susceptibilities, and other agronomic characteristics which one year of yield data, one planting date, and one fertilizer/fungicide/herbicide management system may not highlight.

Grain yield was analyzed for each individual location through one-way analysis of variance using PROC GLIMMIX of SAS v. 9.4. Varieties were considered fixed factors and replications were random effects. A combined analysis across locations was performed considering location and replication nested within location as random factors.

## Results and Discussion

The main weather events this crop experienced were dry planting conditions, an extreme cold period in February, a very dry April, and the growing season ended with a cooler, wetter period starting the second week of May that aided grain filling. None of the trials experienced heavy disease infestations.

All five sites presented good yield potential with an average yield of all locations of 57.9 bu/a. The highest yielding trials were at Belle Plaine (67 bu/a) and Clearwater (59.5 bu/a) (Table 1). Overall, wheat yield ranged from 32.5 to 76.4 bu/a. When evaluating the averages of all sites, the five highest yields varied from 62 to 67 bu/a.

Nineteen varieties yielded in the top statistical group in at least one of the five locations (Table 1). Varieties AP18 AX and Showdown both yielded in the highest statistical group in four locations. No varieties were in the top group at all five locations. Eleven varieties failed to reach the top yielding group at all locations. In the combined analysis, AP18 AX, Bob Dole, AG Radical, LCS Atomic AX, Gallagher, Showdown, Smith's Gold, Paradise, Rock Star, and WB4401 were in the highest yielding group.

## Conclusions

A number of varieties in the trial provided great yields in South Central Kansas. The variety test indicates variability among sites and highlights the importance of choosing several varieties to improve yield stability. Each year brings different wheat growing conditions. How the wheat crop responds to the differences is dependent on variety.

Farmers should look for consistent performers offering agronomic characteristics that fit their goals for a particular field. It is beneficial to utilize multiple varieties to minimize the risks that come with each cropping season. While the trials provide valuable information for local farmers, they should be utilized along with other variety selection resources. When selecting wheat varieties, it is vital to use multiple years of yield data,

along with information provided by Extension Specialists and seed company representatives.

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## Acknowledgments

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**Table 1. Wheat grain yield (bu/a) and test weight (TW; lb/bu) results for 2021 at Clearwater, Belle Plaine, Caldwell, Arkansas City, Harper, and the average for all sites**

| | | All sites | | Clearwater | | Belle Plaine | | Caldwell | | Arkansas City | | Harper | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variety | Yield | TW | Yield | TW | Yield | TW | Yield | TW | Yield | TW | Yield | TW | Yield |
| Name | Source | bu/a | lb/bu | bu/a | lb/bu | bu/a | lb/bu | bu/a | lb/bu | bu/a | lb/bu | bu/a | lb/bu |
| AM Cartwright | AgriMaxx | 55.8 | 59.2 | 57.3 | 59.3 | 64.4 | 57.9 | 52.7 | 58.8 | 47.9 | 62.0 | 56.9 | 57.9 |
| AP EverRock | AgriPro | 54.1 | 58.9 | 59.4 | 59.3 | 62.8 | 58.4 | 45.6 | 59.9 | 55.0 | 60.9 | 47.6 | 56.1 |
| SY Achieve CL2 | AgriPro | 56.3 | 60.8 | 60.1 | 60.0 | 64.9 | 59.9 | 52.5 | 61.6 | 47.7 | 61.9 | * | * |
| SY AP18 AX | AgriPro | **67.0** | 59.5 | **68.9** | 58.6 | **72.1** | 58.8 | 53.4 | 59.9 | **68.5** | 61.3 | **72.1** | 58.7 |
| SY Bob Dole | AgriPro | **62.0** | 61.0 | 60.2 | 60.4 | **69.1** | 59.6 | **62.5** | 60.2 | 52.4 | 65.2 | 65.9 | 59.6 |
| SY Monument | AgriPro | 55.6 | 57.8 | 56.9 | 58.3 | 60.7 | 56.9 | 53.8 | 58.6 | **57.6** | 58.9 | 49.1 | 56.2 |
| AG Icon | AGSECO | 55.9 | 59.3 | 56.1 | 59.4 | 63.7 | 59.6 | 51.3 | 59.5 | 56.2 | 61.2 | 52.1 | 57.1 |
| AG Radical | AGSECO | **60.7** | 60.2 | 60.9 | 60.7 | **70.7** | 59.9 | 51.3 | 60.9 | **69.4** | 62.6 | 51.4 | 56.8 |
| KS Hatchett | KWA | 54.4 | 60.1 | 60.1 | 59.7 | 64.6 | 61.2 | 47.5 | 62.5 | * | * | 45.3 | 56.9 |
| KS Western Star | KWA | 52.2 | 59.0 | 55.1 | 60.2 | 65.0 | 59.1 | 49.4 | 58.2 | 52.6 | 61.4 | 38.9 | 56.0 |
| Larry | KWA | 58.1 | 58.9 | **63.3** | 59.6 | 66.9 | 58.0 | 50.1 | 59.4 | **57.2** | 60.6 | 53.0 | 57.1 |
| Zenda | KWA | 55.4 | 61.2 | 55.4 | 61.1 | 67.3 | 60.2 | 47.4 | 62.0 | 51.2 | 62.5 | 55.7 | 60.2 |
| LCS Atomic AX | LCS | **60.6** | 60.4 | **65.9** | 60.0 | **69.2** | 58.8 | 54.3 | 61.0 | 52.9 | 61.6 | * | * |
| LCS Chrome | LCS | 58.4 | 59.7 | 58.7 | 60.3 | **69.3** | 58.6 | **57.2** | 58.9 | 54.9 | 62.5 | 51.6 | 58.3 |
| LCS Helix AX | LCS | 57.8 | 59.4 | 59.0 | 60.3 | **67.8** | 59.5 | 56.0 | 59.5 | 54.8 | 61.1 | 51.2 | 56.5 |
| LCS Julep | LCS | 56.0 | 60.2 | 61.0 | 60.8 | 64.7 | 58.2 | 52.8 | 61.2 | 55.2 | 61.2 | 46.4 | 59.6 |
| LCS Photon AX | LCS | 56.6 | 61.7 | 56.8 | 62.1 | **67.4** | 61.8 | 47.9 | 61.0 | 50.6 | 62.6 | 60.3 | 61.1 |
| Butler's Gold | OGI | 49.5 | 60.2 | 51.8 | 59.0 | 59.2 | 59.3 | 44.2 | 61.5 | 32.5 | 61.0 | 59.7 | 60.4 |
| Doublestop CL+ | OGI | 56.1 | 61.4 | 57.8 | 61.3 | 62.2 | 60.9 | **56.4** | 61.3 | 41.2 | 61.6 | 62.9 | 61.8 |
| Gallagher | OGI | **61.7** | 60.9 | **67.7** | 60.3 | **67.6** | 58.9 | 49.6 | 61.1 | **61.8** | 63.3 | * | * |
| Green Hammer | OGI | 57.5 | 60.1 | 55.9 | 59.3 | 63.2 | 59.6 | 53.6 | 59.9 | 47.6 | 61.8 | 67.1 | 59.8 |
| Showdown | OGI | **64.2** | 59.5 | **66.1** | 59.9 | **76.4** | 59.3 | **62.1** | 61.0 | **58.8** | 60.3 | 57.5 | 57.1 |
| Smith's Gold | OGI | **61.1** | 60.5 | 58.8 | 60.8 | **74.6** | 59.8 | 49.4 | 60.6 | **62.3** | 61.7 | 60.2 | 59.5 |
| Strad CL+ | OGI | 57.2 | 60.2 | 59.7 | 61.0 | 66.8 | 60.3 | **56.1** | 60.4 | 38.2 | 59.8 | 65.3 | 59.5 |
| Uncharted | OGI | 56.7 | 59.5 | 55.8 | 58.9 | **67.9** | 59.0 | 49.6 | 59.6 | 52.7 | 61.5 | 57.3 | 58.3 |
| Paradise | Polansky | **62.8** | 60.1 | 59.8 | 59.9 | 66.1 | 60.6 | **57.6** | 59.3 | 55.4 | 60.5 | **75.0** | 60.3 |
| Rockstar | Polansky | **64.9** | 59.2 | **63.8** | 60.0 | **76.2** | 58.1 | **63.4** | 59.4 | 56.2 | 61.2 | 65.0 | 57.5 |
| WB4269 | WestBred | 53.2 | 59.8 | 56.4 | 60.3 | 61.5 | 60.1 | 48.3 | 59.5 | 50.6 | 61.7 | 48.9 | 57.3 |
| WB4401 | WestBred | **61.9** | 61.3 | 59.7 | 60.8 | **72.2** | 59.5 | 51.4 | 61.5 | **57.0** | 63.0 | **69.3** | 61.4 |
| WB4699 | WestBred | 53.9 | 58.3 | 56.9 | 58.9 | 66.5 | 57.9 | 43.9 | 60.1 | **58.2** | 60.3 | 44.2 | 54.6 |
| Average | | 57.9 | 59.9 | 59.5 | 60.0 | 67.0 | 59.3 | 52.4 | 60.3 | 53.7 | 61.6 | 56.7 | 58.3 |
| Min | | 49.5 | 57.8 | 51.8 | 58.3 | 59.2 | 56.9 | 43.9 | 58.2 | 32.5 | 58.9 | 38.9 | 54.6 |
| Max | | 67.0 | 61.7 | 68.9 | 62.1 | 76.4 | 61.8 | 63.4 | 62.5 | 69.4 | 65.2 | 75.0 | 61.8 |

Values, highlighted in **gray and bold**, belong statistically to the highest yielding group. We cannot say values within the group are different from each other.
*Plots lost to planting or harvest errors.