Southeast Kansas Winter Wheat Variety Test Results - 2021

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Southeast Kansas Winter Wheat Variety Test Results - 2021

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Summary
This is a summary of the winter wheat production conditions in southeast Kansas in 2020-2021 and the results of the winter wheat variety testing. Wheat production in 2021 benefited from dry conditions at planting and harvest. Overall yields were above multi-year averages. As in previous years, soft red winter wheat out-yielded hard red winter wheat varieties.

Introduction
Crop production is dependent on many factors including cultivar selection, environmental conditions, soil, and management practices. This report summarizes the environmental conditions during the 2020-2021 winter wheat growing season in comparison to previous years and the historical averages. Thirteen hard red and 27 soft red wheat varieties were tested at Parsons.

Experimental Procedures
The Kansas State University Crop Performance Tests were conducted in replicated research fields throughout the state. This report summarizes winter wheat production for Parsons, Kansas. Wheat varieties were tested in Parsons silt loam soil at the Southeast Research and Extension Center in Parsons. All crop variety trials are managed with conventional tillage. Individual variety results are available at the Kansas State University Crop Performance Test website (http://www.agronomy.k-state.edu/services/crop-performance-tests/).

Wheat was drilled in 7-in. rows at 1.2 million seed/acre (approx. 90 lb/acre) in conventional tillage with an Almaco plot drill on September 29, 2020, in Parsons and harvested June 23, 2021. Plots were 7 ft wide × 27.5 ft long. Fertilizer was applied before planting at a rate of 50-46-30 lb/acre N-P-K (dry), with an additional 60-46-30 lb/acre N-P-K (dry) applied in February for both hard red and soft red cultivars. No fungicides or herbicides were applied. Historical weather data from the Parsons and Columbus Mesonet stations were used (http://mesonet.k-state.edu/weather/historical/).
Results and Discussion
A very wet spring in 2021 (Sassenrath et al., 2022) resulted in some Fusarium head blight (FHB) infection in the wheat. However, the dry conditions after May preserved the wheat quality and limited the scab damage.

Winter wheat was planted on 7.3 million acres in Kansas in 2021, an increase from last year. Statewide average wheat yield was 52 bu/acre, more than the 14-year average of 43 bu/acre. The highest yield in the hard red wheat varieties was measured in WB4401 at 92.0 bu/acre (Figure 1A; Table 1). This is well above the 12-year average yield of 53.1 bu/acre in the variety trials, and the 12-year average yield of 40.7 bu/acre across the state. Wheat yields in the hard red wheat variety trials showed much greater variability than in previous years, ranging from a low of 28.0 bu/acre to a high of 92 bu/acre. Overall, yields were much lower than last year. However, across all hard red varieties, the average yield of 55.5 bu/acre was near average (14-year hard red wheat yield average: 52.8 bu/acre).

Yields in the soft wheat varieties were very good this year (Figures 1 and Table 2). Statewide yields for soft red wheat are not reported, so hard red wheat variety yields for the KS state average are given as comparison. Soft red wheat yield of 90.4 bu/acre across all varieties in 2021 was much higher than the 12-year average of 68.3 bu/acre for soft red wheat in the variety trials. The highest yield of 103.8 bu/acre was measured in an experimental line, EXP1425, from Northern Star Seed. Five other varieties also had yields above 100 bu/acre (Table 2). In addition to greater yields, another potential advantage of soft red wheat is greater resistance to disease. This was observed in the FHB and reported in Sassenrath et al., 2022. Those varieties that had greater resistance to diseases tended to have higher yields.

Heading, defined as the date when 50% of the plot had heads emerged, was measured in the variety trials. Heading in the hard red varieties began April 25, 2021 and was complete by April 29. Heading in the soft red varieties occurred between April 27 and April 30, 2021.

Conclusions
Wheat production was good in 2021. Dry planting conditions in the fall allowed timely planting. Adequate winter moisture allowed good stand establishment and tillering. Although high moisture during anthesis increased the FHB pressure, dry conditions during harvest allowed timely harvest prior to excessive vomitoxin production. Southeast Kansas has a high probability of rainfall during May and June, often limiting field access and timely wheat harvest, resulting in increasing disease damage.

Comparing variety performance across different growing seasons gives an understanding of how a variety responds under different growing conditions. For ease of comparison, variety testing results from the previous 4 years are provided for hard red (Table 1) and soft red (Table 2) varieties at Parsons. Note, no data were available from 2019 due to poor plant stand.

No herbicides or fungicides are normally used in the variety trials to provide an equal comparison based only on genetics. However, timely application of fungicide has been
shown to be especially important in high rainfall areas such as southeast Kansas in order to control fungal diseases. Application of appropriate fungicides around flowering are especially important to control FHB (Onofre and De Wolf, 2020).

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Table 1. Multiyear comparison of hard red winter wheat yields from variety trials at Parsons, KS

| Company         | Variety     | 2017 Yield | Test weight | 2018 Yield | Test weight | 2020 Yield | Test weight | Fusarium rating | Stripe rust rating | 2021 Yield | Test weight |
|-----------------|-------------|------------|-------------|------------|-------------|------------|-------------|---------------|-------------------|-------------|-------------|
| AgriMAXX        | AM Cartwright | 82.9       | 60.8        | 70.5       | 55.3        |            |              |               |                   |             |             |
| AgriMAXX        | AM Eastwood  | 47.2       | 55.5        | 56.8       | 58.5        | 67.2       | 57.9        | 3             | 8                 | 33.9        | 51.7        |
| Syngenta AgriPro| SY Benefit   | 56.9       | 57.7        | 45.2       | 57.4        | 77.5       | 59.5        | 1             | 7                 | 37.5        | 50.3        |
| Syngenta AgriPro| SY Grit      | 50         | 56.5        | 65.1       | 57.5        | 3          | 3           |               |                   |             |             |
| AGSECO          | AG Icon      | 47.4       | 57.2        | 80.5       | 60          | 2          | 4           |               |                   | 42.2        | 75.9        |
| AGSECO          | AG Radical   | 76.1       | 56.6        | 0          | 3           | 28         | 50          |               |                   |             |             |
| AGSECO          | TAM 205      | 83.5       | 60.2        | 5          | 1           |            |             |               |                   |             |             |
| KWA Wildcat     | Everest      | 60.5       | 58.1        | 48.6       | 59.3        | 78.9       | 60.8        | 1             | 8                 | 49.8        | 54.1        |
| Genetics        | Zenda        | 60.7       | 58.4        | 43.5       | 59.7        | 86.1       | 60.8        | 1             | 2                 | 66.1        | 55.2        |
| OGI             | Smith’s Gold |            |             |            |             |            |             |               |                   | 84.5        | 60.1        |
| Polansky        | High Country  | 79.2       | 58.3        | 3          | 2           | 54         | 52.7        |               |                   |             |             |
| Polansky        | Paradise     |            |             |            |             |            |             |               |                   | 79.2        | 54.2        |
| Polansky        | Rock Star    |            |             |            |             |            |             |               |                   | 67.5        | 54.6        |
| WestBred        | WB4269       | 55         | 57          | 48.5       | 58.9        | 86.8       | 60.3        | 2             | 3                 | 61.8        | 54.3        |
| WestBred        | WB4303       |            |             |            |             |            |             |               |                   |             |             |
| WestBred        | WB4401       |            |             |            |             |            |             |               |                   | 108.8       | 54.3        |
| WestBred        | WB4699       |            |             |            |             |            |             |               |                   |             |             |
| Overall average, hard red winter wheat | 57.1 | 57.4 | 51.7 | 58.1 | 81.1 | 59.2 | 55.5 | 55.1 | | |

Yields above average are highlighted in bold.
Table 2. Multiyear comparison of soft red winter wheat yields from variety trials at Parsons, KS

| Company       | Variety   | 2017   | Test weight | Yield | 2018   | Test weight | Yield | 2020   | Test weight | Yield | 2021   | Test weight | Yield |
|---------------|-----------|--------|-------------|-------|--------|-------------|-------|--------|-------------|-------|--------|-------------|-------|
|               |           | bu/a   | lb/bu       | bu/a  | lb/bu  | bu/a        | lb/bu | bu/a   | lb/bu       | bu/a  | lb/bu  | bu/a        | lb/bu |
| AgriMAXX      | 415       | 91.9   | 57.3        | 56.7  | 58.1   | 102.7       | 59.7  | 0      | 0           |       |        |             |       |
| AgriMAXX      | 473       | 83.2   | 57.9        | 65.1  | 57.5   | 106.1       | 59    | 0      | 1           |       |        |             |       |
| AgriMAXX      | 492       |        |             |       |        |             |       |        |             |       |        |             |       |
| AgriMAXX      | 503       |        |             |       |        |             |       |        |             |       |        |             |       |
| AgriMAXX      | 505       | 113.9  | 60.1        | 0     | 1      | 102.5       | 56.2  | 0      | 1           |       |        |             |       |
| AgriMAXX      | 513       | 112.2  | 60.7        | 2     | 5      | 100.3       | 57.2  | 0      | 1           |       |        |             |       |
| AgriMAXX      | 514       |        |             |       |        |             |       |        |             |       |        |             |       |
| Beachner      | GB0206    |        |             |       |        |             |       |        |             |       |        |             |       |
| Beachner      | GB0208    |        |             |       |        |             |       |        |             |       |        |             |       |
| Beachner      | Roane     |        |             |       |        |             |       |        |             |       |        |             |       |
| Becks         | 726       |        |             |       |        |             |       |        |             |       |        |             |       |
| Becks         | 727       |        |             |       |        |             |       |        |             |       |        |             |       |
| Becks         | 730       |        |             |       |        |             |       |        |             |       |        |             |       |
| DuPont Pioneer| 25R40     | 79.5   | 56.8        | 66.1  | 56.7   | 105.8       | 58.1  | 3      | 1           |       |        |             |       |
| DuPont Pioneer| 25R50     | 57.1   | 57         | 97.5  | 59.3   | 0           | 1     |        |             |       |        |             |       |
| DuPont Pioneer| 25R61     | 71.4   | 57.8        | 61.6  | 57.9   | 87.5        | 58.3  | 0      | 7           |       |        |             |       |
| DuPont Pioneer| 25R74     | 80.8   | 57.6        | 65.4  | 56.3   | 110.4       | 61.6  | 0      | 1           |       |        |             |       |
| Dupont Pioneer| 25R77     | 84.4   | 57.9        | 54.2  | 56.9   | 103         | 61.6  | 2      | 3           |       |        |             |       |
| Dyna-Gro      | 9002      |        |             |       |        |             |       |        |             | 76.4  | 53.4   |             |       |
| Dyna-Gro      | 9120      |        |             |       |        |             |       |        |             | 101.3 | 57.4   |             |       |
| Dyna-Gro      | 9151      |        |             |       |        |             |       |        |             | 95.6  | 56.6   |             |       |
| Dyna-Gro      | 9172      |        |             |       |        |             |       |        |             | 97.6  | 55.6   |             |       |
| Dyna-Gro      | 9701      |        |             |       |        |             |       |        |             | 90.1  | 55.4   |             |       |

Yields above average highlighted in bold.
Table 2 (cont’d). Multiyear comparison of soft red winter wheat yields from variety trials at Parsons, KS

| Company  | Variety   | 2017 Yield | Test weight | 2018 Yield | Test weight | 2020 Yield | Test weight | 2021 Yield | Test weight | Fusarium rating | Stripe rust rating | Average Yield | Test weight |
|----------|-----------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|-------------|----------------|-----------------|---------------|-------------|
| Dyna-Gro | 9811      | 91.5       | 54.4        | 94.9       | 55.2        | 85.4       | 54.6        | 88.6       | 53.6        | 103.8       | 53.9           | 78.2           | 57.5          |
| Dyna-Gro | 9941      |            |             |            |             |            |             |            |             |             | 89.4           |               | 59.9          |
| Dyna-Gro | WX21741   |            |             |            |             |            |             |            |             |             | 82.4           |               | 57.0          |
| NSS      | EXP1410   | 98.0       | 54.8        | 94.9       | 54.7        | 85.2       | 53.6        | 88.6       | 53.9        | 103.8       | 54.0           | 78.6           | 54.0          |
| NSS      | EXP1415   |            |             |            |             |            |             |            |             |             | 89.4           |               | 59.9          |
| NSS      | EXP1419   |            |             |            |             |            |             |            |             |             | 82.4           |               | 57.0          |
| NSS      | EXP1425   |            |             |            |             |            |             |            |             |             | 89.4           |               | 59.9          |
| NSS      | EXP1450   |            |             |            |             |            |             |            |             |             | 82.4           |               | 57.0          |
| NSS      | EXP1472   |            |             |            |             |            |             |            |             |             | 89.4           |               | 59.9          |
| OGI      | OCW035S80S-8WF | 84.4 | 56.8 | 2 | 4.75 | 37.8 | 48.8 |

Average

Yields above average highlighted in bold.

Figure 1. Winter wheat yield for (A) hard red wheat and (B) soft red wheat from variety trials in southeast and eastern Kansas from 2008 through 2021. In 2019, variety testing at both Ottawa and Parsons were abandoned due to flooding and poor stands. The line in the middle of the box plots is the median yield of all varieties. The upper and lower quartiles are given by the upper and lower edges of the boxes. The maximum and minimum values are given by the upper and lower “whiskers” extending from the box. Outliers are given as solid circles. For comparison, average reported state yields from Kansas are highlighted as a red X.