

Southeast Kansas Winter Wheat Variety Test Results - 2021

G.F. Sassenrath, L. Mengarelli, J. Lingenfelter, and X. Lin

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 web site (<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).

Acknowledgments

This work is supported by the U.S. Department of Agriculture National Institute of Food and Agriculture, Hatch project 1018005. These data are part of the 2021 Winter Wheat Performance Tests, SRP 1165.

References

- Onofre, K.A., De Wolf, E.D. 2020. Foliar fungicide efficacy ratings for wheat disease management 2021. April 2021. KSU Ag Exp Station and Coop Ext Serv. EP130. <https://bookstore.ksre.ksu.edu/pubs/EP130.pdf>.
- Sassenrath G.F., Andersen Onofre, K. 2022. Comparison of Fusarium Head Blight in winter wheat varieties, 2021. *Kansas Agricultural Experiment Station Research Reports*: Vol. 8.

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.

2022 SEREC AGRICULTURAL RESEARCH

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

Company	Variety	2017		2018		2020		Fusarium rating	Stripe rust rating	2021	
		Yield	Test weight	Yield	Test weight	Yield	Test weight			Yield	Test weight
		bu/a	lb/bu	bu/a	lb/bu	bu/a	lb/bu			bu/a	lb/bu
AgriMAXX	AM Cartwright					82.9	60.8	1	1	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 Genetics	Everest	60.5	58.1	48.6	59.3	78.9	60.8	1	8	49.8	54.1
KWA Wildcat 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	2	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					67.2	55.4	4	6		
WestBred	WB4401					108.8	61.5	1	1	92	57.8
WestBred	WB4699					94.5	58.7	2	2	39.5	50.7
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.

2022 SEREC AGRICULTURAL RESEARCH

Table 2. Multiyear comparison of soft red winter wheat yields from variety trials at Parsons, KS

Company	Variety	2017		2018		2020		2021			
		Yield	Test weight	Yield	Test weight	Yield	Test weight	Fusarium rating	Stripe rust rating	Yield	Test weight
		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	94.0	55.2
AgriMAXX	492									99.9	56.3
AgriMAXX	503					113.9	60.1	0	1	102.5	56.2
AgriMAXX	505					112.2	60.7	2	5	100.3	57.2
AgriMAXX	513									99.3	55.0
AgriMAXX	514									93.3	54.4
Beachner	GB0206									96.4	53.7
Beachner	GB0208									89.9	55.1
Beachner	Roane									71.7	56.4
Becks	726									101.0	54.8
Becks	727									95.2	56.3
Becks	730									76.3	53.9
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		2018		2020		2021			
		Yield	Test weight	Yield	Test weight	Yield	Test weight	Yield	Test weight		
		bu/a	lb/bu	bu/a	lb/bu	bu/a	lb/bu	bu/a	lb/bu		
Dyna-Gro	9811							91.5	54.4		
Dyna-Gro	9941							94.9	55.2		
Dyna-Gro	WX21741							85.4	54.6		
NSS	EXP1410							98.0	54.8		
NSS	EXP1415							85.2	54.7		
NSS	EXP1419							88.6	53.6		
NSS	EXP1425							103.8	53.9		
NSS	EXP1450							78.6	54.0		
NSS	EXP1472							96.1	56.8		
OGI	OCW03S580S-8WF					84.4	56.8	2	4.75	37.8	48.8
Average		78.2	57.5	59.9	57	102.4	59.5			90.4	54.9

Yields above average highlighted in bold.

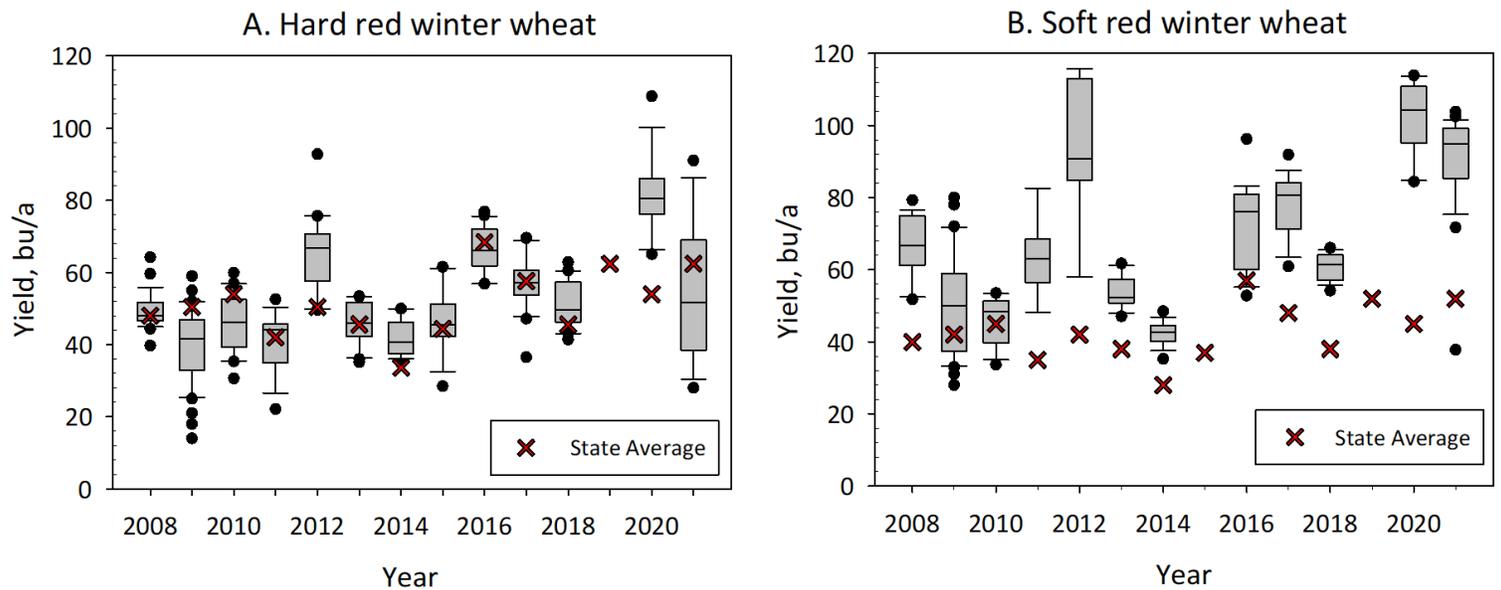


Figure 1. Winter wheat yield for (A) hard red wheat and (B) soft red wheat from variety trials in southeast and eastern Kansas from 2008 through 2021. In 2019, variety testing at both Ottawa and Parsons were abandoned due to flooding and poor stands. The line in the middle of the box plots is the median 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.