

Corn, Soybean and Sunflower Production – 2024 Summary

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Summary

Soybean and corn varieties were tested in replicated field trials at the Southeast Research and Extension Center in Parsons through the Kansas State University variety testing program. In 2024, 16 corn varieties were planted in March 2023. Excess rain led to a very poor stand, and the corn varieties were replanted in mid-June. The late planting led to very poor performance and the test was abandoned. The soybean variety test also failed and was abandoned. Twelve sunflower varieties were tested and harvested. The 2024 growing season was nearly average, but divergent rainfall resulted in flooding early, and long periods of drought in mid- to late summer. Lack of early autumn rains greatly reduced soybean yields. Temperatures throughout the summer were above the 14-year average.

Introduction

Kansas State University performs crop variety testing annually at several locations throughout the state. The Southeast Research and Extension Center tests crop varieties of corn, soybeans, and sunflowers. Variety selection is an important determinant of potential yield. Variety selection is also an important factor in disease and insect management. The crop variety tests performed through the Kansas State University variety testing program allow a comparison of variety performances under common growth conditions and management practices in multiple regions throughout the state.

Environmental conditions are key factors in determining crop success, together with soil characteristics, fertility, and management practices. Of the environmental factors, temperature and moisture (rainfall) are primary determinants of crop performance. Temperature is critical at certain crop developmental stages and plays a role in yield potential. Cumulative Growing Degree Days (GDD) are commonly used to estimate crop growth and developmental stage. Extreme Degree Days (EDD) are an indication of high-temperature exposure during the growing season and can negatively affect crop growth, development, and yield.

This report summarizes corn, soybean, and sunflower variety performance in Parsons, KS, in 2024. Corn varieties were initially planted in April, but excessive rain resulted in a poor stand; corn was replanted in June, but very poor stand establishment led to abandoning the test. Soybean varieties were abandoned because of poor yield due to very low fall rain.

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Experimental Procedures

The Kansas State University Crop Performance Tests were conducted in replicated research fields throughout the state. Individual variety results are available at the K-State Crop Performance Test webpage (<http://www.agronomy.k-state.edu/services/crop-performance-tests/>). This report summarizes crop production for southeast Kansas, focusing on crops grown at Parsons and southeast Kansas. In 2024, crop varieties of corn, soybeans, and sunflowers were planted in 30-inch rows in upland fields (Parsons silt loam soil) at the Southeast Research and Extension Center in Parsons using conventional management and fertility. All crop variety trials are managed with conventional tillage. All crops germinated and appeared healthy.

Corn varieties were planted on March 23, 2024, in 30-inch rows at a rate of 23,000 seeds per acre. Excessive rain resulted in very poor stand establishments. Plots were replanted on June 15, 2024. Very poor germination resulted from low rainfall, and plots were abandoned.

Full-season soybeans were planted in 30-inch rows at a seeding rate of 123,000 seeds per acre on June 17, 2024, but abandoned due to poor plant stand.

Double-crop oilseed sunflowers were planted in 30-inch rows following wheat harvest on July 15, 2024, at a seeding rate of 23,000 seeds per acre. Plots were fertilized at a rate of 110-46-60 lb/acre N-P-K. Weeds were controlled with glyphosate (1 qt/acre), 2,4-D LV6 (1.5 pt/acre), Prowl H₂O (50 oz/acre), Spartan charge (8 oz/acre), and Clethodium (10 oz/acre). Sunflowers were harvested on Nov. 22, 2024.

State reported crop yield data were downloaded from the National Agricultural Statistic Service Crop database (<https://quickstats.nass.usda.gov/>). Weather data were collected from the Kansas Mesonet website (<http://mesonet.k-state.edu/agriculture/degreedays/>) for a weather station located at SEREC in Parsons. Cumulative rainfall was calculated throughout the year and during the summer growing season (March – Sept.). Cumulative growing degree days were calculated using base of 50°F during the summer growing season. The number of days of high temperatures (greater than 90°F) were calculated during the summer growing season. Extreme degree days were calculated as temperatures above 86°F.

Results and Discussion

Rainfall during the 2024 summer growing season (beginning with corn planting in March through the end of September) was 28.1 inches, slightly below the 14-year average of 29.4 inches (Figure 1). However, rainfall was unevenly distributed. The early spring rainfall (March 1 – April 25) was near normal. The next 47-day period from April 26 – June 11, however, received more than half of the total growing season rainfall of 15.5 inches, with two major rain events separated by long dry periods. A 3.1-inch rainfall in late June was followed by a long dry period beginning on July 3. No appreciable rain was received until August 13, resulting in the failure of the corn and soybean variety trials at Parsons. Although the total summer growing season rainfall was near-normal, the uneven distribution reduced stand establishment. The usual fall rainfall reduced soybean grain development and yields in the area.

The temperature during the 2024 summer growing season was above average (Figure 2), with total growing degree days (GDD, base 50) of 4295, above the 14-year average

(4040). The number of days with temperatures in excess of 90°F was also above the 14-year average, with seven additional high-temperature days (Figure 3). Interestingly, the number of extreme degree days (463, EDD, base 86) was very near the 14-year average (468; Figure 4).

The area planted to corn in Kansas increased to 6.3 million acres in 2024, with 92% of the acreage harvested for grain; 5% of corn was harvested for silage. Grain yield statewide (Figure 5, 129 bu/acre) was slightly above the 50-year average (126 bu/acre).

Soybean acreage increased slightly in 2024, with 4.53 million acres planted. Production across the state was also higher than in 2023, with an average statewide yield of 35 bu/acre in 2024 (Figure 6). Ninety-seven percent of the planted soybean acres were harvested. Reduced fall rainfall limited soybean production in southeast Kansas. Due to very low yields, individual variety results are not reported. The average yield from the variety trials at Parsons was 13.8 bu/acre, well below the 14-year average at the location, and below the overall state average.

The statewide average yield of sunflowers was 1005 lb/acre. The yield from the variety trials at Parsons was slightly above the statewide average, but below the 14-year average at 1280 lb/acre (Figure 7).

Conclusions

The year 2024 was average for rainfall and slightly above normal for temperature. The lack of late-season rainfall reduced some crop yields, especially for soybeans, which usually fill pods with the early autumn rainfall. Corn that was planted timely was able to silk prior to drought and did about average.

Acknowledgments

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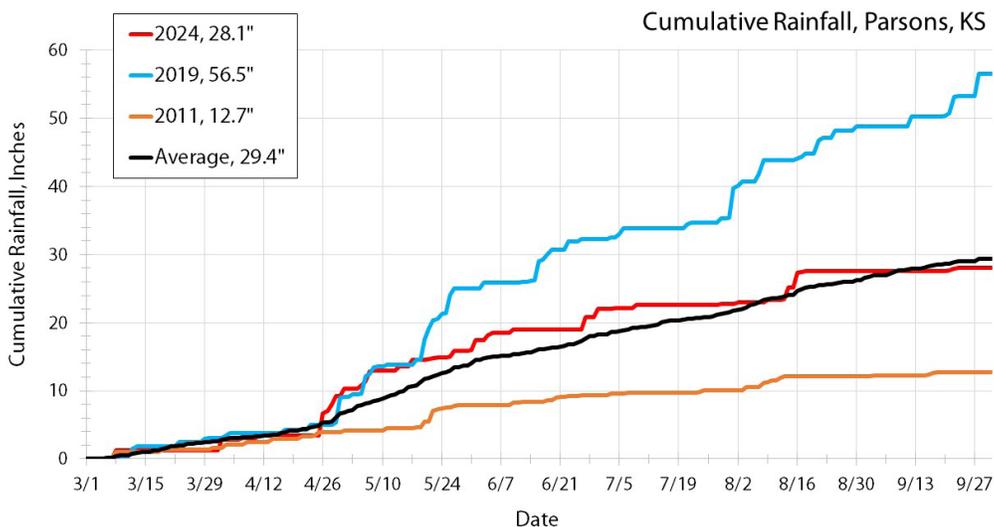


Figure 1. Cumulative rainfall during the summer growing season (March – September) for 2024. Extreme years (2011 and 2019) are shown for comparison with the 14-year average. Total rainfall in inches is given after each year.

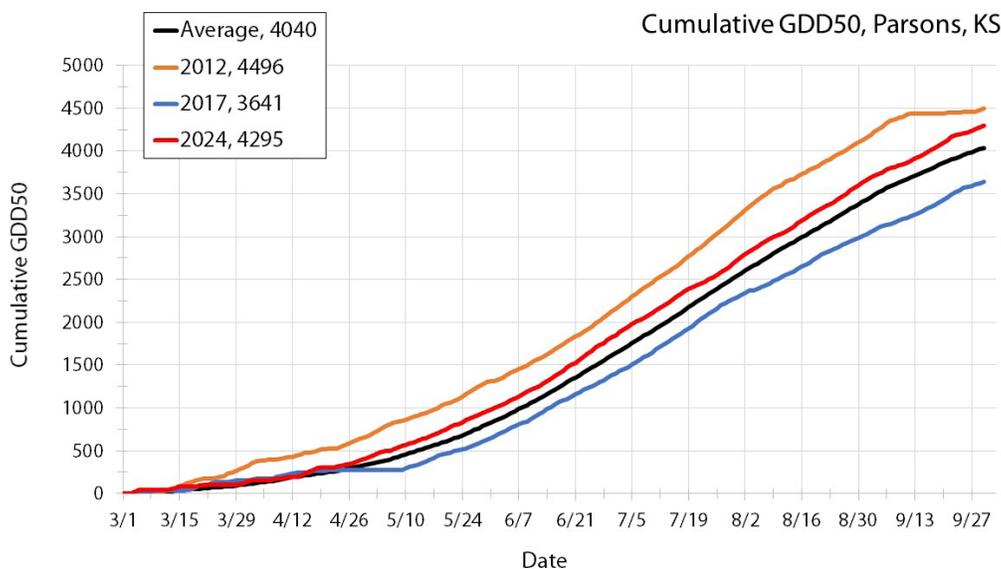


Figure 2. Cumulative growing degree days (GDD, base 50) during the summer growing season (March – September) for 2024. Extreme years (2012 and 2017) are shown for comparison with the 14-year average. Cumulative GDD from March 1 – Sept. 30 are given for each year.

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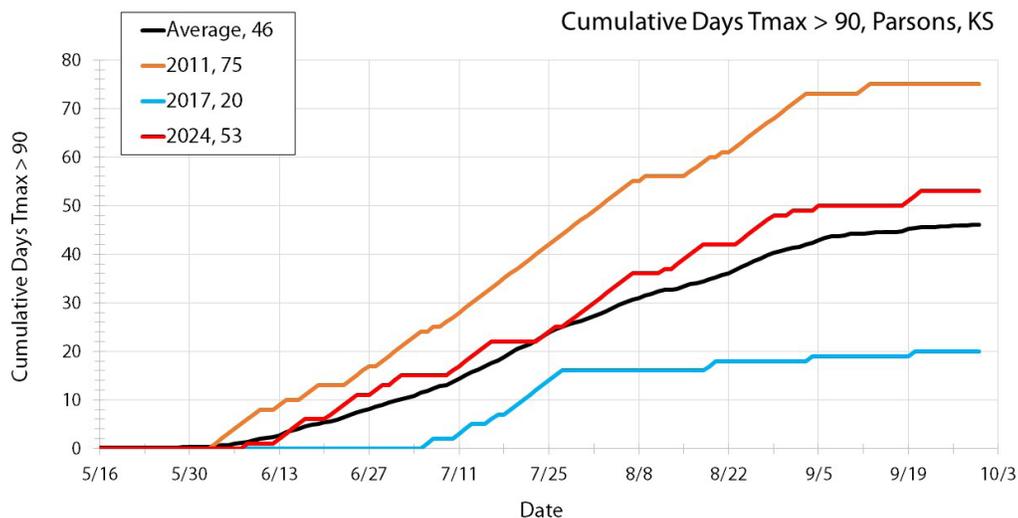


Figure 3. Cumulative number of days with high temperature exceeding 90°F during the summer growing season (March – September) for 2024. Extreme years (2011 and 2017) are shown for comparison with the 14-year average. Total number of days is given after each year.

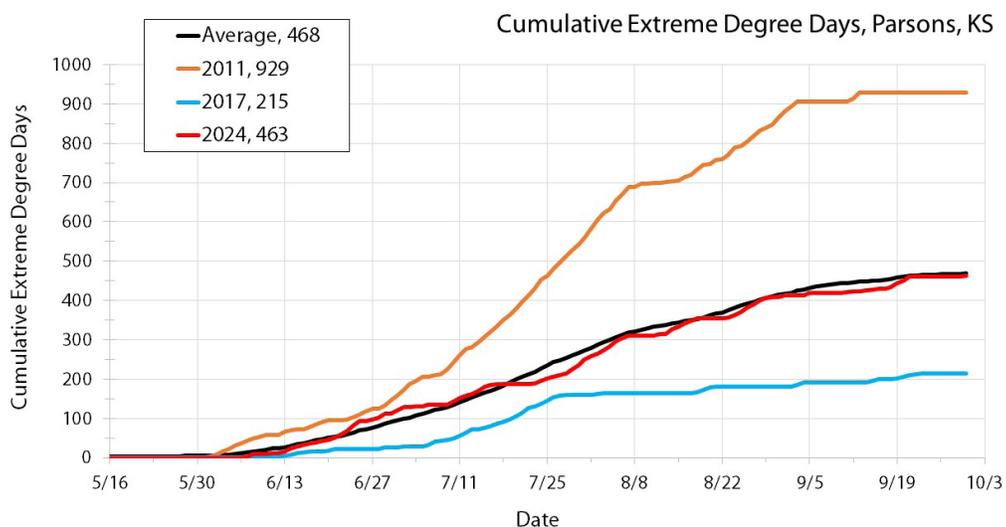


Figure 4. Cumulative extreme degree days (EDD, base 86°F) during the summer growing season (March – September) for 2024. Extreme years (2011 and 2017) are shown in comparison with the 14-year average. Total EDD are given after each year.

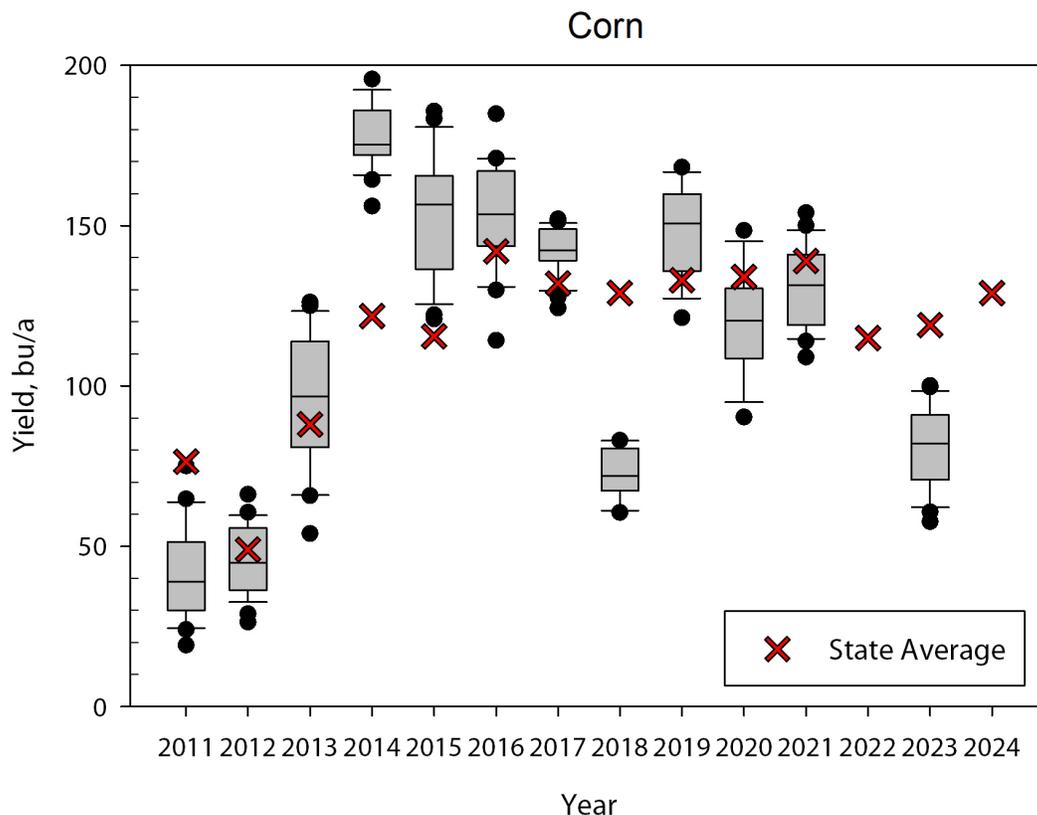


Figure 5. Corn variety test results at Parsons, KS, from 2011 – 2024. The line in the middle of the box plots is the median yield of all varieties. The upper and lower quartiles are given by the upper and lower edges of the boxes. The maximum and minimum values are given by the upper and lower “whiskers” extending from the box. Outliers are given as solid circles. For comparison, average reported yields from Kansas are highlighted as a red X. Corn variety tests were abandoned at Parsons in 2022 and 2024 because of insufficient rainfall.

Soybeans

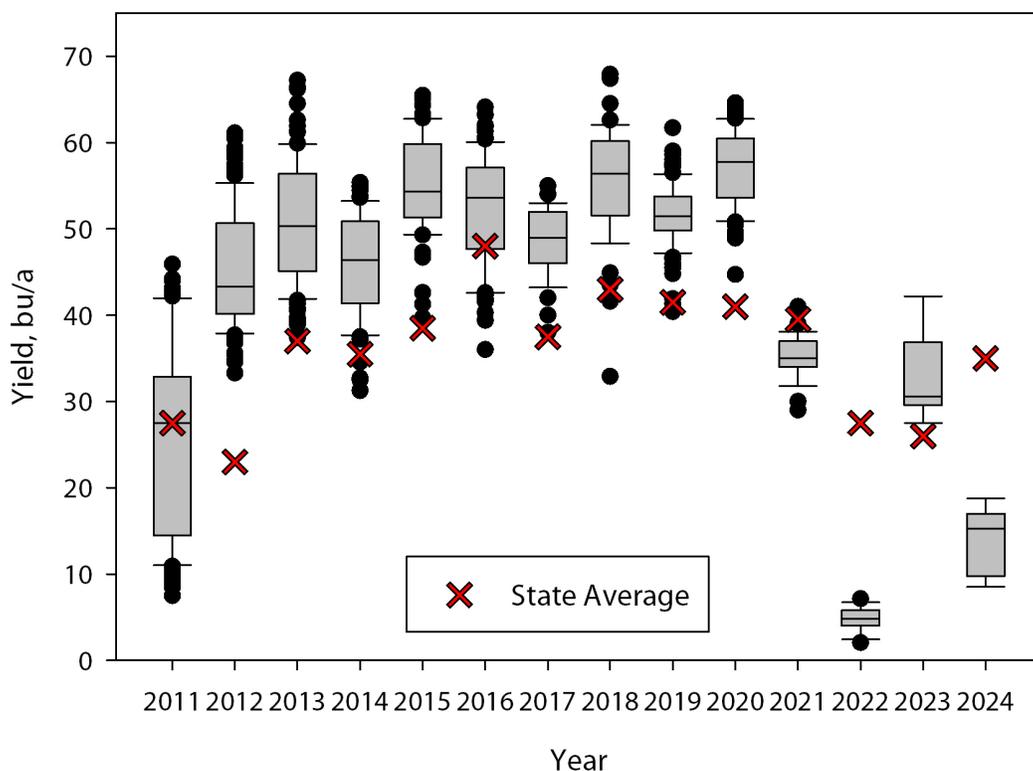


Figure 6. Soybean variety test results at Parsons, KS, from 2011 – 2024. Yields before 2023 are from full-season tests; soybean yields from 2023 are from double-cropped tests. For comparison, average reported Kansas state yields are highlighted as a red X. The variety test from 2024 was harvested, but results for each variety were not released due to poor stand.

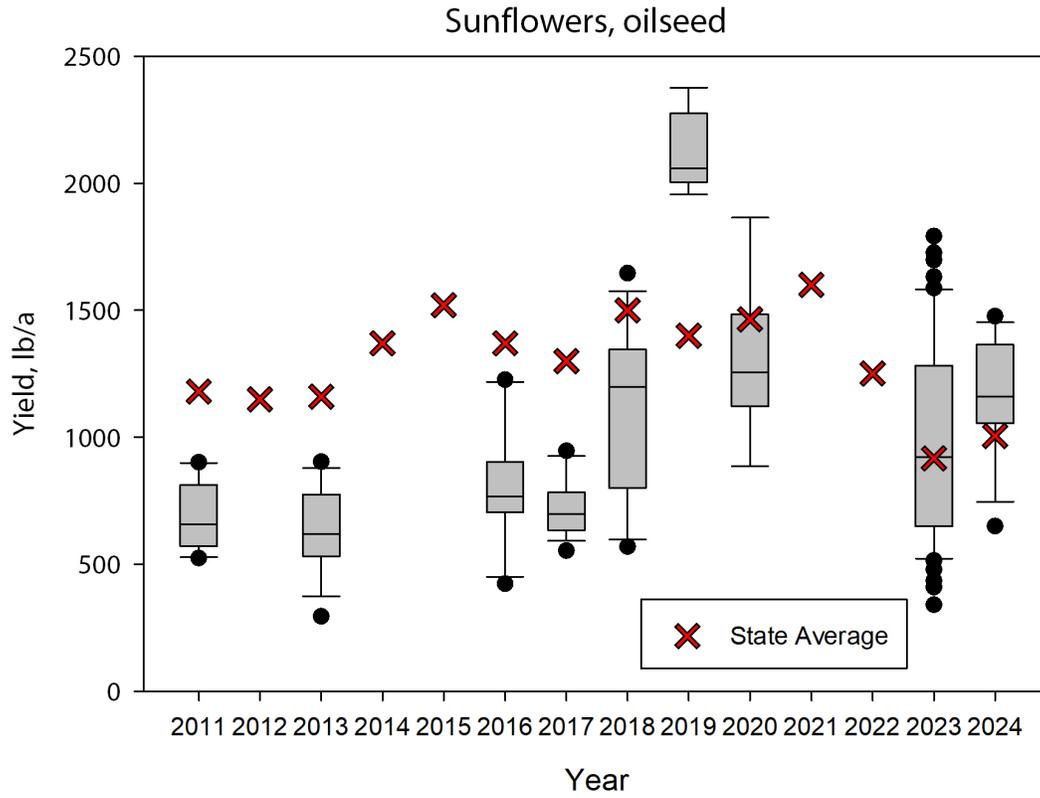


Figure 7. Oilseed sunflower variety test results from Parsons, KS from 2011 – 2023. For years with no bars, the variety tests failed. For comparison, average reported Kansas state yields are highlighted as a red X.