

Corn and Soybean Production – 2022 Summary

G.F. Sassenrath, J. Lingenfelter,¹ and X. Lin¹

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 total, nine corn varieties and three maturity checks were tested. Fourteen full season and ten double-cropped soybean varieties were tested, with three maturity checks. Additionally, sorghum and sunflower varieties were tested. The 2022 summer crop growing season was challenging. High temperatures and low rainfall reduced crop production. Crop production was severely impacted by the hot, dry conditions, both across the state and in the cultivar trials at Parsons. No yield results are available for the variety tests from Parsons.

Introduction

Variety testing is performed annually at several locations throughout Kansas. The Southeast Research and Extension Center tests crop varieties of corn, soybeans, wheat, sorghum, and sunflowers. Cultivar selection is an important determinant of potential yield. The crop variety tests performed through the Kansas State University variety testing program allows 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.

This report summarizes corn and soybean performance in Kansas over the past fifty years. The temperature and precipitation conditions during 2022 are summarized and compared to previous years and historical averages.

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/outreach->

¹ Department of Agronomy, College of Agriculture, Kansas State University.

and-services/crop-performance-tests/). This report summarizes crop production for southeast Kansas, focusing on crops grown at Parsons, and southeast Kansas. In 2022, crop varieties of corn, soybeans, sorghum, and sunflowers were planted in 30-in. 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. Due to adverse weather conditions during the growing season, all variety tests at Parsons were abandoned.

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 - September). 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.

Results and Discussion

Rainfall during the 2022 summer growing season (beginning with corn planting in March) was near the 12-year average (Figure 1) until early July. Two large rainstorms (4 in. on May 4; 3.48 in. on June 1) kept the total rainfall near average during the early season. However, during the three-month period from June 26 until the end of September, the area received only 2.14 in. of rain, compared to a 12-year average of 12.23 in. The US Drought Monitor (<https://droughtmonitor.unl.edu/Maps/MapArchive.aspx>) indicated the area became abnormally dry in July 5, 2022, with extreme drought by August 9, 2022, and exceptional drought by September 20, 2022. The exceptional drought conditions remain in the area. The summer growing season had total precipitation just slightly above that measured during the very dry 2012 growing season (Figure 1).

Temperature during the 2022 summer growing season was also above average (Figure 2). The cumulative growing degree days (GDD, base 50) were well below the exceptional year of 2012, but more than 240 GDD above the 12-year average. The extent of high temperatures can be seen by the number of days with temperatures above 90°F (Figure 3). The total of high-temperature days in 2022 was only 1 day less than during the 2012 growing season, and substantially (25 days) above the 12-year average.

The area planted to corn has been increasing steadily over the past 50 years (Figure 4a). In 2022, 5.5 M acres of corn were planted in Kansas, down slightly from 2021. Of this, 81% of corn acres were harvested for grain, with a significant uptick in corn harvested for silage (Figure 4b). This is well below the 50-year average of 89% corn grain harvest, most likely because of the hot, dry conditions. Grain yield statewide (115 bu/acre) was also below the 50-year average (125 bu/acre). Silage yield was also reduced from a 50-year average of 15 ton/acre to just 11 ton/acre statewide.

Soybean acreage has also trended upwards over the past fifty years (Figure 5), with 5.05 M acres planted in 2022, an increase from the previous 4 years. Planted soybean acres

are more consistently harvested, with an average of 97% of planted acres harvested. This year saw an increase in abandoned soybean acres, as only 95% of planted acres were harvested. Soybean yield has been steadily increasing over the past 50 years, from a 10-year average of 22.4 bu/acre from 1973-1984, to 39 bu/acre from 2013-2022. The average statewide yield in 2022 of 27.5 bu/acre was significantly less than in the previous 10 years, but more than the drought season of 2012.

Conclusions

The 2022 growing season was challenging. Lack of adequate rainfall in the latter half of the year, combined with high temperatures, impaired crop production.

Acknowledgements

Data included in this report are part of the 2022 Kansas Performance Tests with Soybean Varieties (<https://bookstore.ksre.ksu.edu/pubs/SRP1173.pdf>), and the 2022 Kansas Performance Tests with Corn Hybrids (<https://bookstore.ksre.ksu.edu/pubs/SRP1174.pdf>).

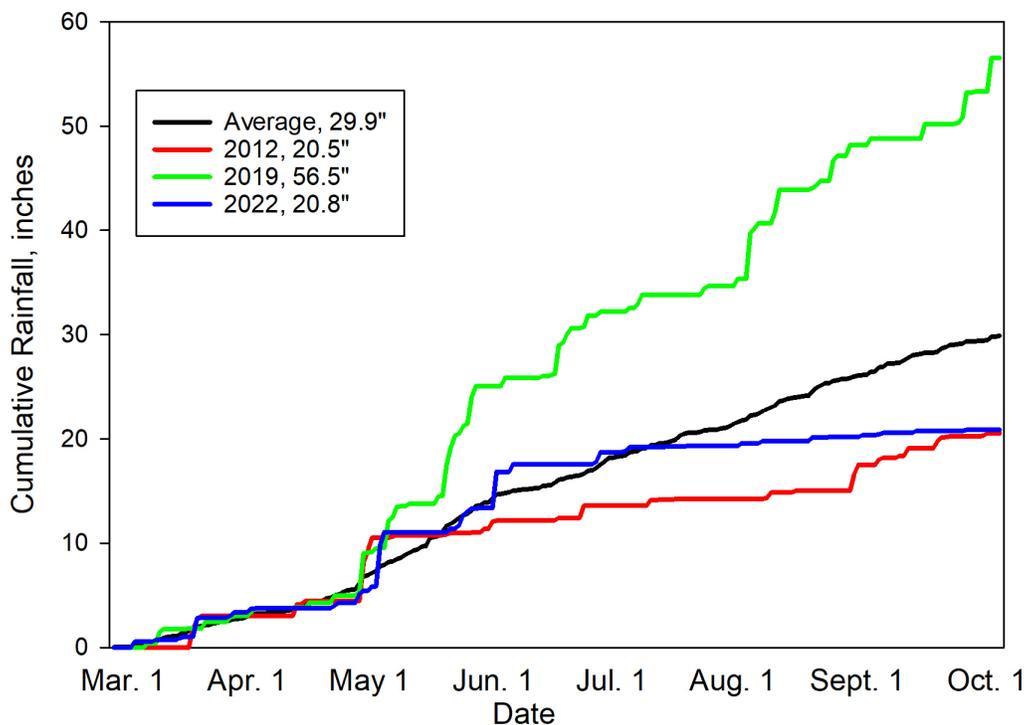


Figure 1. Cumulative rainfall during the summer growing season (March - September) for 2022. Extreme years (2012 and 2019) are shown in comparison with the 12-year average.

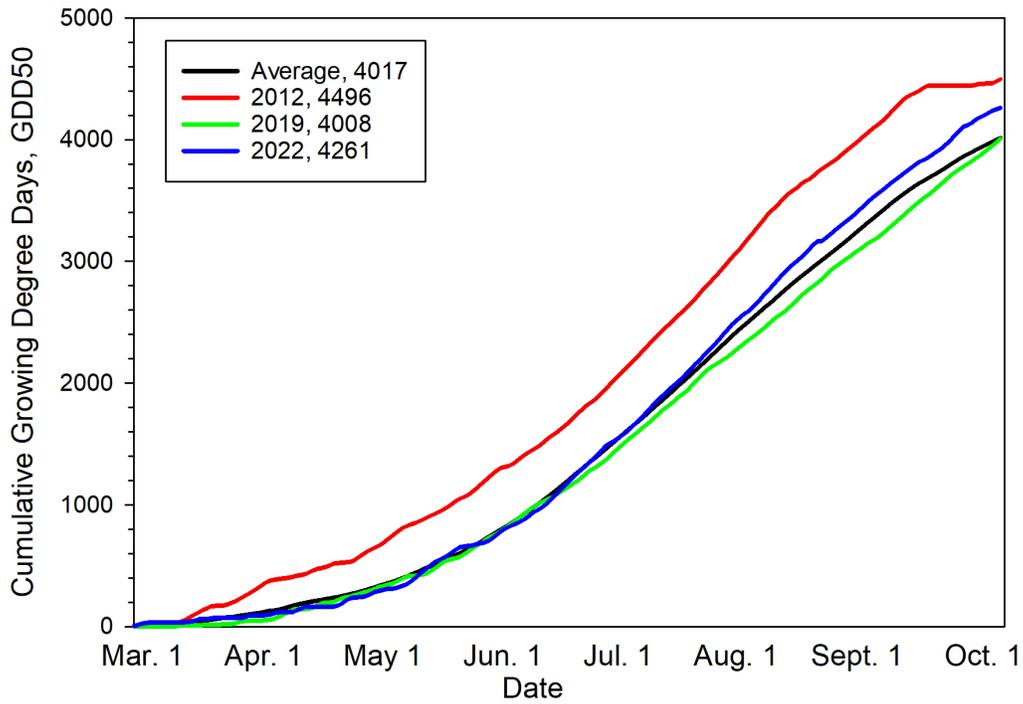


Figure 2. Cumulative growing degree days (50) during the summer growing season (March - September) for 2022. Extreme years (2012 and 2019) are shown in comparison with the 12-year average.

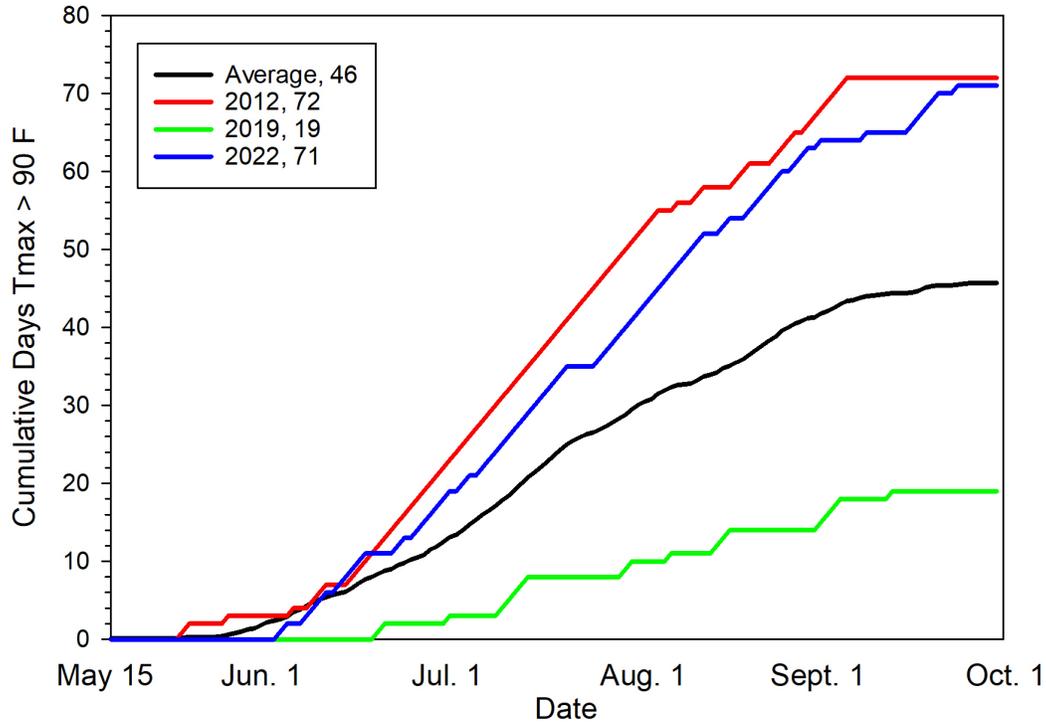


Figure 3. Cumulative number of high temperature (>90°F) days during the summer growing season (March - September) for 2022. Extreme years (2012 and 2019) are shown in comparison with the 12-year average.

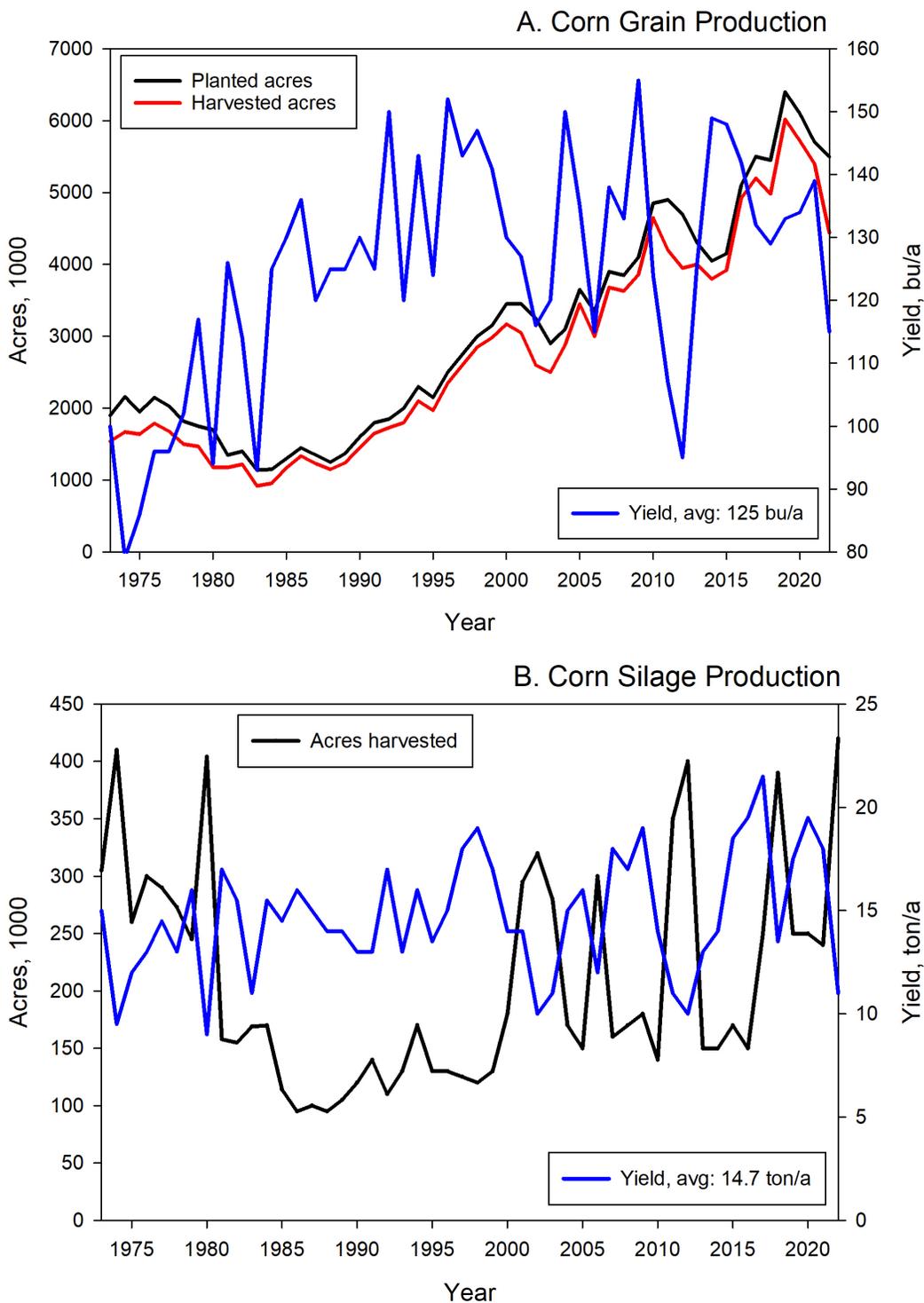


Figure 4. Historical corn production for Kansas. Upper. Corn grain, acres planted, acres harvested, and yield (bu/acre). Lower. Corn silage production, acres harvested and yield (ton/acre).

2023 SEREC AGRICULTURAL RESEARCH

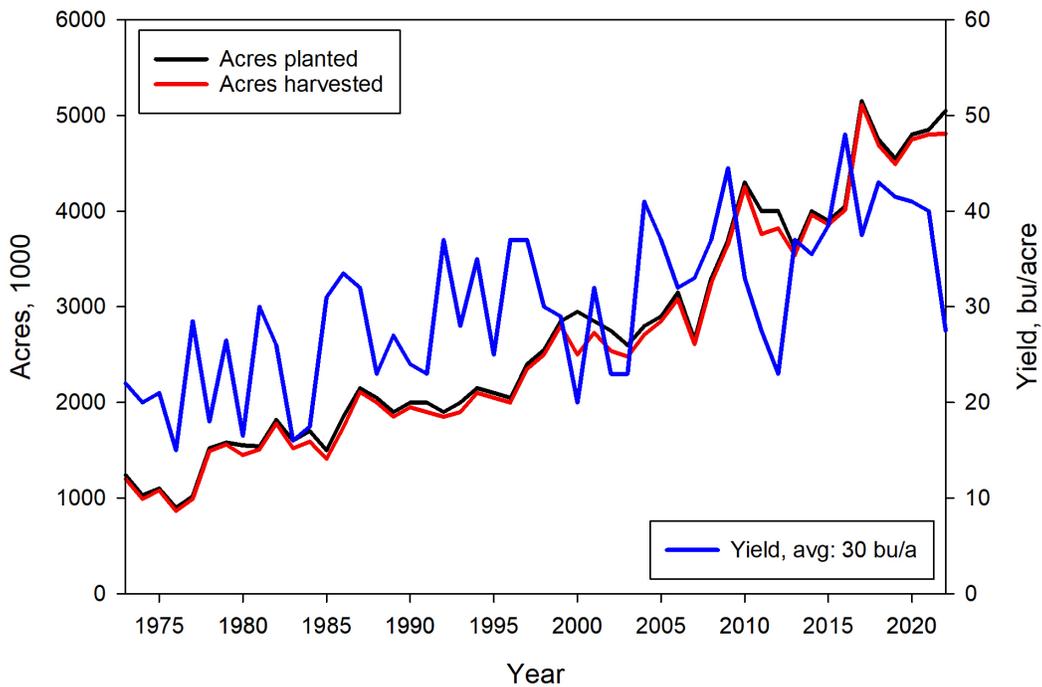


Figure 5. Historical soybean production for Kansas. Soybean acres planted, acres harvested, and yield (bu/acre).