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Crop Production 2020 – Corn, Sorghum, Soybean, and Sunflower Variety Testing

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Crop Production 2020 – Corn, Sorghum, Soybean, and Sunflower Variety Testing

Abstract

This is a summary of the variety testing for corn, sorghum, soybean, and sunflower. Nine corn varieties were tested in 2020, with an average yield of 107.6 bu/a. Twenty-four cultivars of soybeans from maturity groups (MG) 3-4 and twenty-seven cultivars from MG4-5 were tested in both full-season and double-cropped management. Full-season beans yielded an average of 54.5 bu/a for MG3-4 and 58.8 bu/a for MG4-5, which was greater than the average yields in the double-cropped beans at 32 bu/a for MG3-4 and 40.5 bu/a for MG4-5. The state-wide average soybean yield in 2020 was higher than the 10-year average. Nine cultivars of oilseed sunflowers yielded 1307 lb/a across all cultivars, slightly below the 10-year state average yield.

Keywords

crop variety testing, soybeans, full season, double cropped, corn, sunflower, sorghum

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Cover Page Footnote

These data are part of the 2020 Kansas Grain Sorghum Hybrids Performance Test, SRP1161 (<https://bookstore.ksre.ksu.edu/pubs/SRP1161.pdf>).

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Summary

This is a summary of the variety testing for corn, sorghum, soybean, and sunflower. Nine corn varieties were tested in 2020, with an average yield of 107.6 bu/a. Twenty-four cultivars of soybeans from maturity groups (MG) 3-4 and twenty-seven cultivars from MG4-5 were tested in both full-season and double-cropped management. Full-season beans yielded an average of 54.5 bu/a for MG3-4 and 58.8 bu/a for MG4-5, which was greater than the average yields in the double-cropped beans at 32 bu/a for MG3-4 and 40.5 bu/a for MG4-5. The state-wide average soybean yield in 2020 was higher than the 10-year average. Nine cultivars of oilseed sunflowers yielded 1307 lb/a across all cultivars, slightly below the 10-year state average yield.

Introduction

Crop production is dependent on many factors including cultivar selection, environmental conditions, soil, and management practices. This report summarizes results of the variety testing conducted at Parsons, KS. Soybeans tested included 24 varieties of maturity group (MG) 3-4 and 28 varieties of MG4-5. Soybean varieties were tested in both a full-season and a double-cropped soybean test. Nine corn varieties were tested at Parsons, and 9 sunflower varieties were tested. Individual variety results are available at the K-State Crop Performance Test web page (<http://www.agronomy.k-state.edu/services/crop-performance-tests/>).

Experimental Procedures

The Kansas State University Crop Performance Tests were conducted in replicated research fields throughout the state. This report summarizes crop production for southeast Kansas, focusing on crops grown at Parsons, KS. Crop varieties were tested in upland fields (Parsons silt loam soil) at the Southeast Research and Extension Center in Parsons. Poor stand establishment from excessive rain led to abandonment of sorghum plots at Parsons. For comparison, sorghum variety trial yields from Ottawa are used. All crop variety trials are managed with conventional tillage. Individual variety results are available at the K-State Crop Performance Test web page (<http://www.agronomy.k-state.edu/services/crop-performance-tests/>).

Full-season soybeans were planted in 30-in. rows on June 9, 2020, in Parsons, at 100,000 seed/a and harvested November 5, 2020. Double-cropped soybeans were

planted June 23, 2020, at a rate of 100,000 seed/a, and harvested November 6, 2020. No fertilizer was applied. Weeds were controlled with glyphosate (1.5 qt/a), Dual II Magnum (2 pt/a), metribuzin (0.5 lb/a), and Authority XL (6 oz/a).

Sunflowers were planted June 9, 2020, at a rate of 23,800 seed/a in 30-in. rows at Parsons. Plots were fertilized at a rate of 80-46-30 lb/a N-P-K. Weed control was glyphosate (2 qt/a), Brawl II (2 pt/a), and Spartan (4 oz/a). Plots were harvested on November 5, 2020.

Corn varieties were planted on April 7, 2020, in 30-in. rows at a rate of 22,500 seed per acre. Plots were fertilized at a rate of 180-46-60 lb/a N-P-K. Weed control was glyphosate (2 qt/a), Dual II Magnum (1.5 pt/a), Atrazine 4L (2 qt/a), and 2,4-D (2 qt/a). Plots were harvested on October 9, 2020.

Sorghum varieties were planted at Parsons. Heavy spring rain reduced emergence and the variety tests were abandoned. Results from the variety trials at Ottawa are used for comparison to statewide yields. Eleven grain sorghum varieties were tested at Ottawa in a Woodson silt loam soil at a planting rate of 45,000 plants/a. Plots were fertilized at a rate of 140-48-31-10 lb/a N-P-K-S in still-tilled management. Details of Ottawa grain sorghum production can be found in the 2020 Kansas Grain Sorghum Hybrids Performance Test (<https://bookstore.ksre.ksu.edu/pubs/SRP1161.pdf>).

Results and Discussion

There was adequate moisture at planting for the full-season soybean test. Germination and plant stand were very good. The plants had an established root system, and were able to come through the dry summer very well. In contrast, the decreased rainfall made planting and germination of the double-cropped beans challenging. Limited moisture during the first three months of the double-cropped test resulted in poor weed control due to low canopy coverage and inactivated herbicides. High humidity in the fall slowed the drying process after soybean maturity, but harvest went well.

Soybeans were planted on 4.75 million acres in Kansas in 2020, with 1.19 million acres in southeast Kansas. Twenty-four cultivars of soybeans from maturity groups (MG) 3-4 were tested. Average yield in the full-season test was 54.5 bu/a, with a range of 44.7 to 62.9 bu/a (Figure 1A). Yields were less in the double-cropped beans, with an average of MG3-4 of 32 bu/a, ranging from 25.3–41.1 bu/a. Group 4-5 beans performed slightly better, the 27 varieties tested had an average in the full-season test of 58.8 bu/a, with a range from 51.4–64.6 bu/a (Figure 1B). Double-cropped MG4-5 yields were also less than full-season, with an average of 40.5 bu/a and a range from 28.2 to 44.3 bu/a. The statewide average soybean yield was 40.5 bu/a, which was higher than the 10-year average of 37.2 bu/a statewide.

Sunflowers were planted on 73,000 acres in Kansas in 2020, and 96% of the acres were harvested for an average statewide yield of 1,470 lb/a. In the variety trials, sunflowers were planted in good soil moisture. Plants germinated quickly and had good stand establishment. There were no notable problems with insects or disease in 2020. Some problems with lodging were noted due to wet conditions at harvest. Nine cultivars of

oilseed sunflowers were grown in 2020, with an average yield of 1307 lb/a and a range from 886 to 1865 lb/a (Figure 2). This was slightly less than the 10-year state average yield of 1342 lb/a and the state average yield.

Corn was planted on 6.1 million acres in Kansas in 2020, an increase from the 10-year average but a slight decrease from last year. Ninety-four percent of planted acres were harvested for grain at a statewide average yield of 134 bu/a, and 4% were harvested for silage at a statewide average yield of 19.5 ton/a. As in 2019, heavy spring rains in excess of record-setting levels the prior year (Sassenrath et al., 2021) created detrimental conditions for early spring corn crop establishment in southeast Kansas. Nine corn varieties and three checks were tested at Parsons, ranging from relative maturity of 100 to 115 days. Average yield was 119.9 bu/a, and ranged from a low of 90.3 bu/a to 148.5 bu/a (Figure 3).

Grain sorghum was planted on 3 million acres in Kansas in 2020, an increase from last year and above the 10-year planting average of 2.8 million acres. Ninety-three percent of planted acres were harvested for grain at a statewide average yield of 85 bu/a. Two percent of planted acres were harvested for silage, with an average statewide yield of 15 tons/a. Eleven varieties and six check cultivars of grain sorghum were grown at Ottawa, producing an average of 137.5 bu/a, with a range from 99.8–164.0 bu/a (Figure 4).

Conclusions

Southeast Kansas had exceptionally high rainfall until June (Sassenrath et al., 2021) that reduced crop establishment in the spring of 2020. By late spring, however, the rain stopped, creating dry conditions. Fields that missed the intermittent summer rains had reduced yields. Heat unit accumulation was near normal at Parsons. Though 2020 started out as a wet year, soybeans and sunflowers produced slightly better than average. Full season soybeans had more moisture at planting than double-cropped soybeans, and performed better.

Acknowledgment

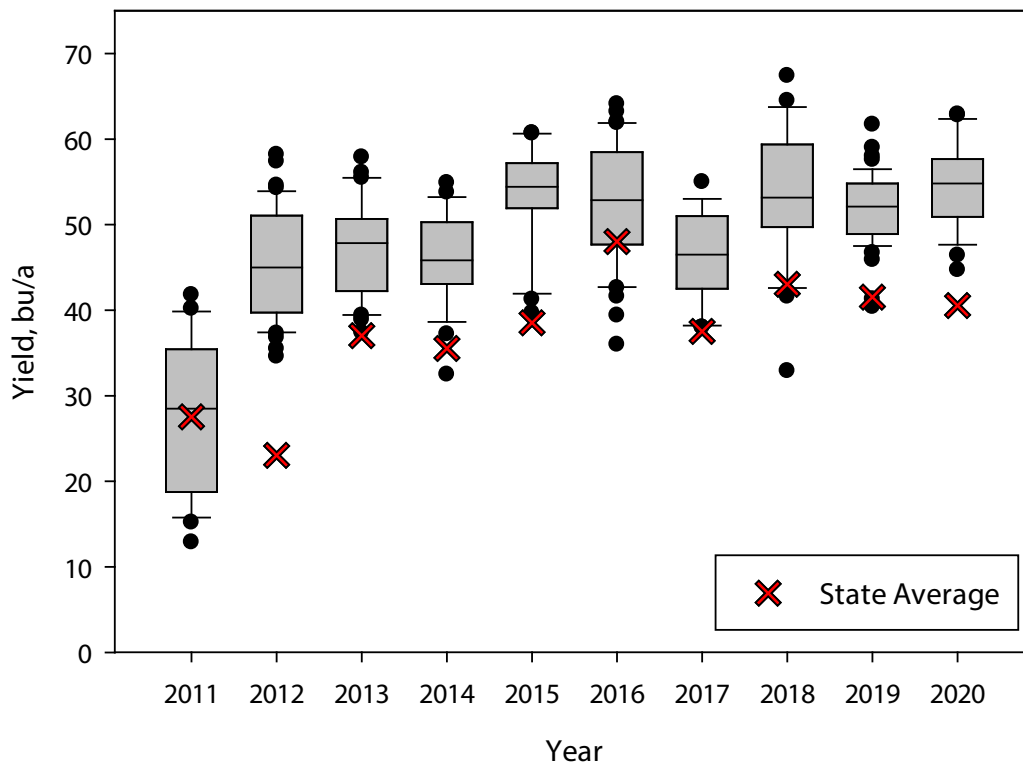
These data are part of the 2020 Kansas Grain Sorghum Hybrids Performance Test, SRP1161 (<https://bookstore.ksre.ksu.edu/pubs/SRP1161.pdf>).

References

Sassenrath, G.F., M. Knapp, X. Lin. 2021. Southeast Kansas Weather Summary – 2020. Kansas Agricultural Experiment Station Research Reports: Vol. 7.

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A. Soybeans, Groups 3-4



B. Soybeans, Groups 4-5

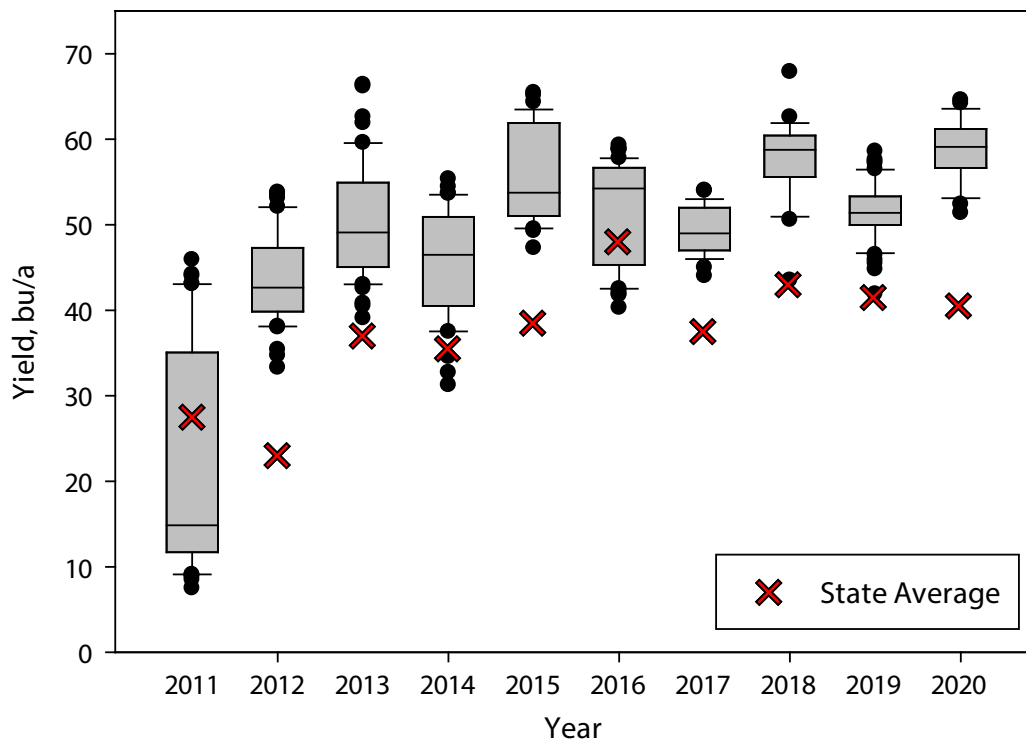


Figure 1. Comparison of soybean yield for full-season tests at Parsons. The line in the middle of the box plots is the median yield of all varieties. The upper and lower quartiles are given by the upper and lower edges of the boxes. The maximum and minimum values are given by the upper and lower “whiskers” extending from the box. Outliers are given as solid circles. For comparison, average reported yields from Kansas are highlighted as a red X.

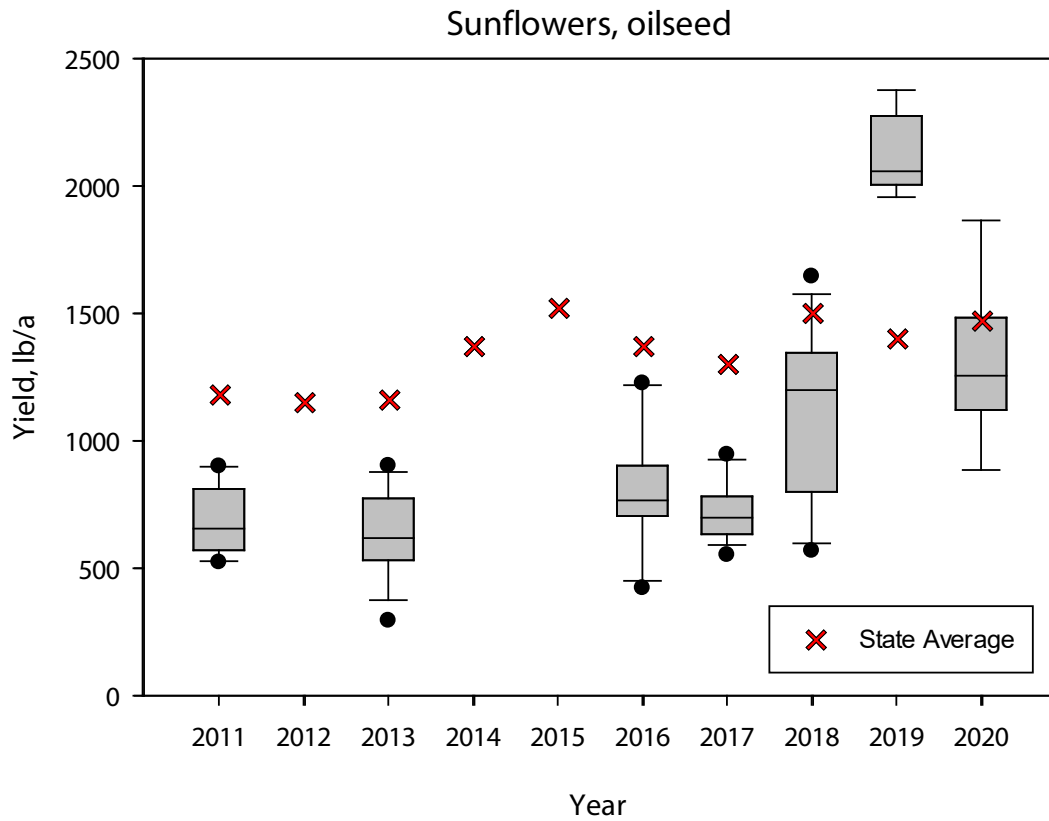


Figure 2. Oilseed sunflower yields from variety trials grown at Parsons, KS, from 2011 through 2020. Yield data were not available from the variety plots in 2012, 2014, or 2015. For comparison, average reported Kansas state yields are highlighted as a red X.

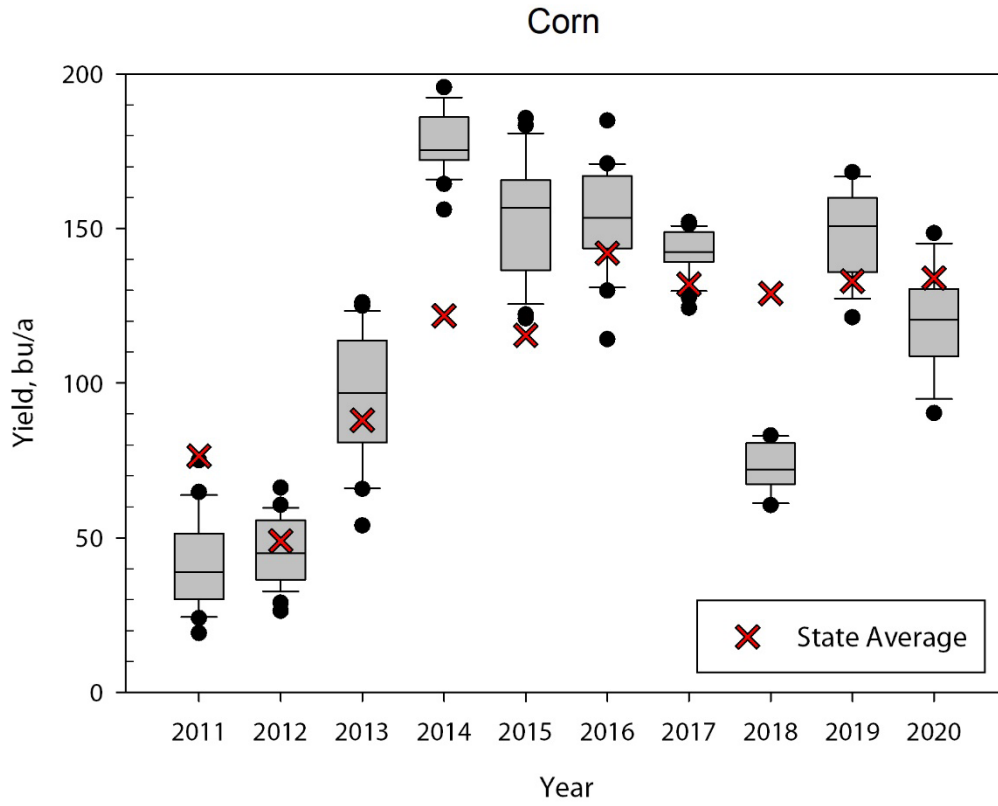


Figure 3. Corn yields at Parsons from variety trials grown from 2011 through 2020. For comparison, reported state average yields are highlighted as a red X.

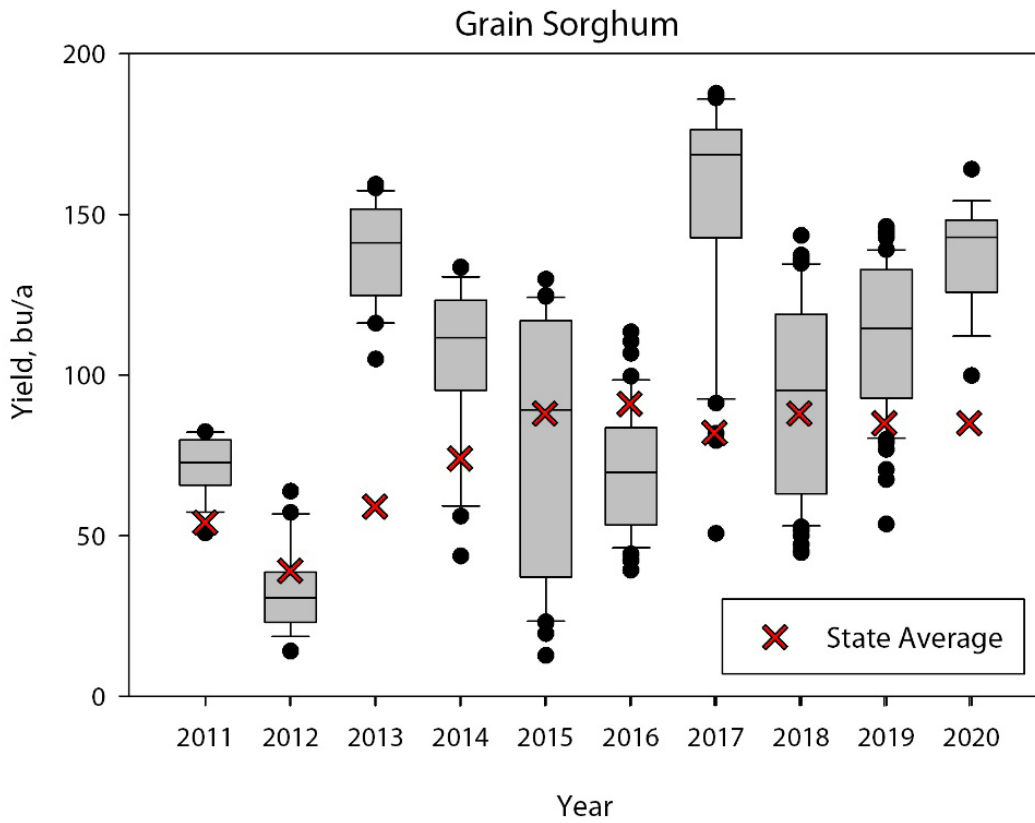


Figure 4. Grain sorghum yields from variety trials. 2011 through 2019 data were from Parsons. In 2020, the field at Parsons was flooded out. Data from Ottawa from 2020 are used for comparison. For comparison, reported state average yields are highlighted as a red X.