**Project Report for MSSB- 29 January 2020**

**Effects of the Introduction of Feed Grains into Mid-South Soybean Production Systems**

The grain rotation project was established starting in 2014 at seven locations across the Mid-South United States. The locations include:

1. Portageville, MO *(2014-2019)*

2. Colt, AR *(2014-2019)*

3. Newport, AR *(2014-2019)*

4. Stoneville, MS *(2014-2019)*

5. Brooksville, MS *(2014-2019)*

6. St. Joseph, LA *(2014-2019)*

7. College Station, TX *(2014-2018)*

Twelve rotations were established including both irrigated and dryland rotations. Two residue management treatments were also included in this study. Corn and sorghum residues were either burned or left as it is after crop harvest. The rotations included in study were:

1. Irrigated Continuous Corn- corn planted every year

2. Irrigated Continuous Soybean- MG 4 soybean planted every year

3. Irrigated 1:1 Soybean to Corn- MG 4 soybean planted in one year followed by corn the next year

4. Irrigated 2:1 Soybean to Corn- MG 4 soybean planted two years in a row followed by corn

5. Irrigated 1:2 Soybean to Corn- MG 4 soybean planted one year followed by two years of corn

6. Dryland Continuous Corn- corn planted every year

7. Dryland Continuous Soybean- MG 4 soybean planted every year

8. Dryland 1:1 Soybean to Corn- MG 4 soybean planted in one year followed by corn the next year

9. Dryland 1:1 Soybean to Grain Sorghum- MG 4 soybean planted one year followed by grain sorghum the next year

10. Dryland Continuous Grain Sorghum- grain sorghum planted every year

11. Corn/Wheat/DC Soybean- Corn planted in the first year. After corn harvest wheat is planted and the harvested the following year. After wheat is harvested, double crop soybeans are planted and harvested in the same year.

12. Corn/Soybean/Wheat/DC Soybean- Corn is planted the first year. Soybeans are planted the second year. Following soybean harvest, wheat is planted. The wheat is harvested in the third year and then double crop soybeans are planted after wheat harvest.

The two-year rotations including rotation 3, 8, 9 from list above had completed three full cycles by 2019, whereas 3-year rotations completed two full cycles by 2019. 2019 was the last funded year of the project. Some locations may continue this project for next few years depending upon their own funding availability. At present, Dr. Stevens, Dr. Jeremy Ross and I am thinking to continue this project.

Currently, the yield data from 2019 is received from all locations except two locations in AR. I am in process of analyzing the data using the SAS statistical software. Hopefully, I will get the yield data from Dr. Ross’s research associate this month and finish the manuscript on crop yields for submission to peer-reviewed journal. The soil samples collected in fall 2019 for soil nutrient and nematode analysis were received from all locations by last week. All soils samples were air-dried, packed and will be delivered to the Louisiana State University’s Soil Testing lab in Baton Rouge, LA this week. Usually, the soil testing lab takes 2-3 months for analysis of all samples. Once analyzed, the data will be analyzed statistically for publication in a peer-reviewed journal. Results from this project including grain yield and soil properties data were presented at the previous MSSB meetings as well as at the various conferences or extension meetings. I am currently working on the 2019 data and results will be presented in next MSSB meeting.

List of presentations or published abstracts at the American Society of Agronomy meeting include:

1. Kaur, G., B.R. Golden, W.J. Ross, G. Stevens, T. Irby, J. Copes, and G. Singh. 2019. Effects of crop rotation on crop yields in the Mid-South United States. ASA-CSSA Annual Meeting, San Antonio, TX. 10-13 November.
2. Kaur, G., J.M. Orlowski, B.R. Golden, D. Reynolds, W.J. Ross, G. Stevens, T. Irby, J. Copes, C.B. Neely, M. Rhine, D.L. Hathcoat and R.W. Schnell. 2018. Effects of crop rotation on soil chemical properties in the mid-south US. ASA-CSSA Annual Meeting, Baltimore, MD. 4-7 November.
3. Kaur, G., J.M. Orlowski, B.R. Golden, W.J. Ross, G. Stevens, T. Irby, J. Copes, C.B. Neely, M. Rhine, D.L. Hathcoat and R.W. Schnell. 2017. Effects of crop rotation on soil chemical properties in the mid-south US. ASA-CSSA-SSSA Annual Meeting, Tampa, FL. 22-25 October. Available online: <https://scisoc.confex.com/scisoc/2017am/webprogram/Paper106220.html>
4. Kaur, G., L. Falconer, J.M. Orlowski, B.R. Golden, W.J. Ross, G. Stevens, T. Irby, J. Copes, C.B. Neely, M. Rhine, D.L. Hathcoat, and R.W. Schnell. 2017. Crop rotation effects on corn and soybean yields and economic returns in the mid-south United States. ASA-CSSA-SSSA Annual Meeting, Tampa, FL. 22-25 October. Available online: <https://scisoc.confex.com/scisoc/2017am/webprogram/Paper105901.html>
5. Orlowski, J.M., B.R. Golden, T. Irby, R. Levy, C.B. Neely, W.J. Ross, R.W. Schnell, G. Stevens, D. Hathcoat. 2016. Effect of the Introduction of Feed Grains into Mid-South Soybean Production Systems. ASA-CSSA-SSSA Annual Meeting, Phoenix, AR. 6-9 November. Available online: <https://scisoc.confex.com/crops/2016am/webprogram/Paper102307.html>
6. Golden, B.R. S. Kakaire, T. Allen, M.D. Fuhrmann, T. Irby, J. Lofton, C.B. Neely, W.J. Ross, R.W. Schnell, G. Stevens, D. Hathcoat, and M. Rhine. 2015. Preliminary Nematode Survey from Soybean-Corn Rotations in the Mid-South U.S. ASA-CSSA-SSSA Annual Meeting, Minneapolis, MN. 15-18 November. Available online: <https://scisoc.confex.com/crops/2015am/webprogram/Paper95425.html>
7. W.J. Ross, B.R. Golden, M.D. Fuhrmann, T. Irby, J. Lofton, C.B. Neely, R.W. Schnell, G. Stevens, D. Hathcoat, L. Falconer, L. Bell, and M. Rhine. 2015. An Evaluation of Crop Rotation and Soil Nutrients in the Midsouth. ASA-CSSA-SSSA Annual Meeting, Minneapolis, MN. 15-18 November. Available online: <https://scisoc.confex.com/crops/2015am/webprogram/Paper93703.html>

**Extension Articles (Mississippi State University only)**

1. Orlowski, J.M., B. Golden, and **G. Kaur**. **2017**. Identifying the advantages of corn-soybean rotation in Mississippi. Mississippi State University Delta Research and Extension Center, 2016 Annual Report. Available online: <http://drec.msstate.edu/sites/default/files/identifying%20the%20advantages%20of%20the%20corn-soybean%20rotation%20in%20mississippi.pdf>