



## Mississippi Corn Promotion Board 2022 Progress Report

### Project

Title: Determining optimum sulfur fertility rates, timings, and sources for corn.

PI: Dr. Corey Bryant

Department: Delta Research and Extension Center

---

### Project Summary (Issue/Response)



Sulfur deficiency is becoming more common in Mississippi corn production due to reduced atmospheric deposition. Currently Mississippi State University Extension personnel do not have a recommendation regarding sulfur fertilizer rates, timings, or sources for application. This means most growers are either not making sulfur applications, at the potential cost of increased yield, or they are making applications without scientific data to support those decisions. This project included three objectives to determine agronomically and economically optimum sulfur fertilizer rates, application timings, and sources. The studies were conducted at the Mississippi State University, Delta Research and Extension Center in Stoneville, MS. Sulfur rates were 0, 10, 20, 30, and 40 lbs/a S. Sources included no S, ammonium sulfate, ammonium thio-sulfate, micronized sulfur technology, and elemental sulfur. Timings included no S, at planting, V4, V8, and VT. Based on one year of data sulfur fertilizer rate had no effect on corn grain yield. Applying S fertilizer anytime prior to the V9 growth stage increased corn grain yield compared to no S fertilizer while corn grain yield following S applications at the tassel growth stage were no different from no S fertilizer or an earlier application. Sulfur fertilizer source had no effect



---

### Project Results/Outcomes

The three trials listed were conducted in Stoneville, MS during the 2022 corn growing season. **Corn Response to S Fertilizer Rates:** Ammonium sulfate fertilizer was applied as the sulfur source at rates of 0, 10, 20, 30, and 40 lbs of S per acre at planting. Corn planting occurred on April 11<sup>th</sup> followed immediately by fertilizer application. Soil tests in the field tested low to very low in S based on recommendations from Southern Soil and Plant Lab in Yazoo City, MS, indicating we should expect a response from S fertilizer. Yields from the trial were similar with no differences noted between treatments. Similarly, there were no differences in net returns above S fertilizer costs. It is possible that S fertilizer response was not noted in corn yield due to the planting date being delayed by rainfall and excessive heat during pollination. Averaged across treatments corn grain yield was 155 bu/a and net returns above S fertilizer costs were \$808.03 per acre. **Corn Response to S Fertilizer Application Timing:** Ammonium sulfate fertilizer was applied as the sulfur source at a constant rate of 20 lbs of S per acre at five different timings. Timings included no S, at planting, at V4, at V8, and at VT. Soil test S values were similar to the S fertilizer rate trial. Results from this study indicate that applying S fertilizer at any point up to the V8 growth stage will produce a positive yield response. This data also indicates that recovery applications can be made up to the VT growth stage but yield response will not be as strong as earlier applications. Corn grain yield from S fertilizer applications made at planting, V4, and V8 averaged 181 bu/a, a 32% increase over the

## Project Results

---

untreated control. Sulfur fertilizer applications made at the VT growth stage were not different from either the untreated control or any earlier application timing. Net returns above S fertilizer costs for the at plant, V4 and V8 application timings averaged \$949.66 per acre which was a 29% increase over the untreated control. **Corn Response to S Fertilizer Source:** Four different fertilizer S source were applied at planting. Sulfur fertilizer sources included ammonium sulfate, MAP+MST, TigerSul, and No S fertilizer and were applied at planting at a rate of 20 lbs of S per acre. Ammonium thiosulfate was not applied in 2022 due to supply issues and the inability to acquire the fertilizer. Results from this trial indicate that there are no agronomic or economic differences in S fertilizer sources. Averaged across treatments, corn grain yield was 154 bu/acre and net returns above S fertilizer costs were \$810.26 per acre. While sulfur fertilizer rate trials were inconclusive in 2022 it is still recommended that growers apply at least 20lbs/a S to their corn crops to achieve maximal yields. This is especially true on sandy coarse textured soils with low organic matter which will provide very limited amounts S for plant growth and development. These trials do clearly indicate that all S fertilizer applications should be made prior to the V9 growth stage for maximum benefit; however, should a recovery application be required these can go as late as the VT growth stage. Finally, based on these data, there was no agronomic or economic differences between S fertilizer sources. This means that growers should apply the most economical source for their system.

---

## Project Impacts/Benefits

---

Results from these research projects could have many benefits to MS corn growers. While rate and source trials from 2022 were inconclusive there are numerical trends that are expected to become actual differences with further research. The greatest benefit from these trials is the information regarding sulfur fertilizer application timing. Our research indicates a 29% increase in net returns above sulfur fertilizer costs when applied between planting and the V8 growth stage. The 29% increase translate to an additional \$273.74 per acre compared to applying no sulfur fertilizer. Should these results be realized across all 580,000 acres of planted corn in 2022 this would be an increase of 158.8 million dollars in net returns for MS corn producers.

---

## Project Deliverables

---

Results from these studies will be presented at county grower meetings in late January through February as well as at the Conservation Systems Conferences 2023 in Baton Rouge, LA.



**MISSISSIPPI STATE**  
UNIVERSITY™

MS AGRICULTURAL AND  
FORESTRY EXPERIMENT STATION



**MISSISSIPPI STATE**  
UNIVERSITY™

---

**EXTENSION**