



## Mississippi Corn Promotion Board 2018 Progress Report

---

### Project

**Title:** Irrigation and Soil Management Strategies that Improve Irrigation Application Efficiency, Soil Quality, Water Quality and Corn Yield

**PI:** Jeff Johnson, L. Jason Krutz, Erick J. Larson, W. Brien Henry, Bobby Golden, H.C. (Lyle) Pringle III

**Department:** Delta Research and Extension Center

---

### Project Summary (Issue/Response)

---



Corn in Mississippi is primarily grown on lighter-textured soils that have poor quality due to low organic matter content. This results in reduced infiltration from rain and irrigation and increased susceptibility to erosion and off-site N and P transport. Many government agencies are promoting the use of cover crops to improve soil quality, increase irrigation application efficiency, reduce erosion, and provide enhanced nutrient cycling. This research is being conducted to evaluate cover crops ability to provide the purported benefits in a Mississippi corn production system. Studies are underway to evaluate tillage and cover crop (Austrian winter pea, cereal rye, crimson clover, and tillage radish) effect on 1) soil quality [soil organic matter, aggregate stability, infiltration, and water holding capacity], 2) irrigation application efficiency and rainfall capture, 3) surface runoff, erosion, and off-site N and P transport under furrow irrigation and simulated rainfall, 4) nitrogen by irrigation level yield response for leguminous cover crop (Austrian winter pea), and 5) yield, water use efficiency, and profitability. The results of these studies will be used to recommend cover crop/tillage systems that can improve irrigation application efficiency, crop water use, and decrease erosion and off-site N and P transport while maintaining or improving yield and economic profitability.



### Project Results/Outcomes

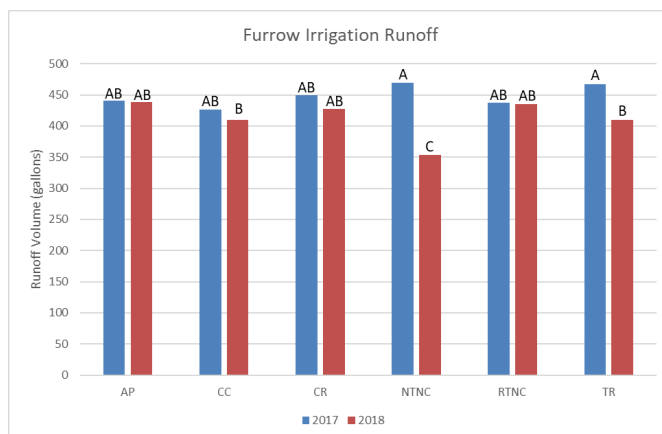
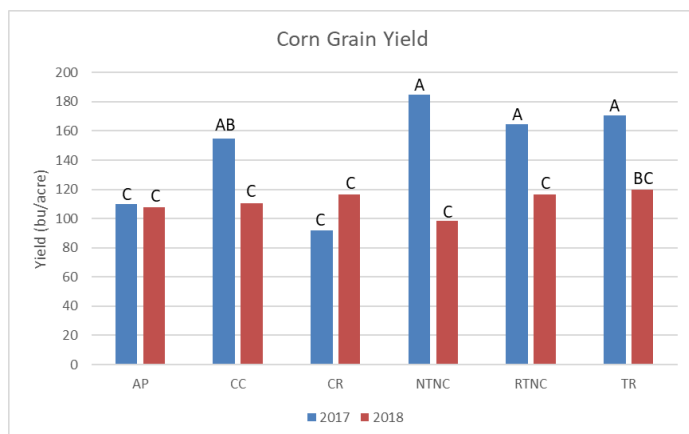
---

Small-plot experiments were conducted in 2017 and 2018 in Stoneville, MS to evaluate the study objectives. No yield benefits have been observed from any of the cover crop or no-tillage treatments, and two cover crops (Austrian winter pea and cereal rye) reduced corn grain yield in 2017. Under furrow irrigation, no-tillage and tillage radish increased infiltration and furrow advance time and reduced runoff in 2018, while no differences were observed in 2017 among treatments. No differences were observed in sediment or nutrient transport in 2017 under furrow irrigation. Under simulated rainfall in 2017, Austrian winter pea increased infiltration while cereal rye resulted in greater amounts of some N and P species in surface runoff water. Other data, including sediment and nutrient transport in 2018, rainfall infiltration and runoff, soil quality, and economics, are under analysis. Previous research suggests that benefits from cover crops may require several years to realize, thus it is important to continue evaluating longer-term changes in a cover crop system.

---

# Project Results

---



---

## Project Impacts/Benefits

The results from this research will allow Mississippi corn producers to make more informed decisions on whether or not to include cover crops in their production systems. Currently, little research exists on cover crop effects on soil quality, water use, erosion, nutrient transport, yield, and economic benefits in the Mid-South. Much of the NRCS's claim of cover crop benefits in the Mid-South are based on testimonials from Mid-West producers. The difference in climate and management practices between the Mid-South and Mid-West are likely to significantly influence the effectiveness of cover crops. The research proposed is necessary to either support or dispute those claims and provide Mid-South growers with the most relevant information for their operations.

---

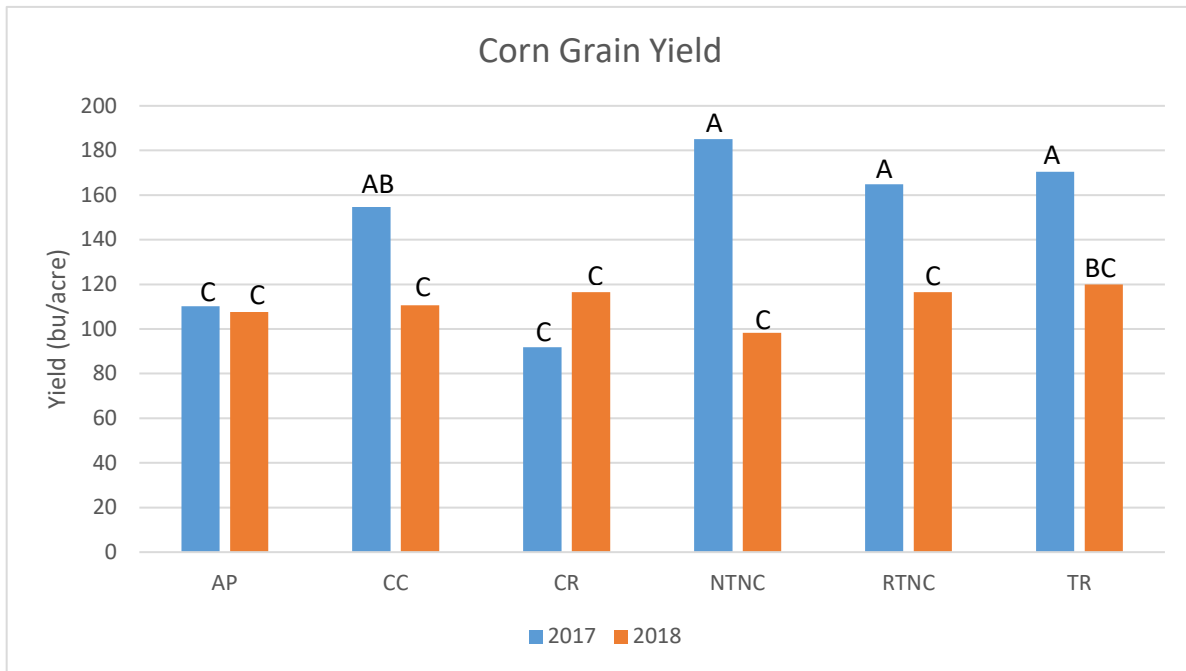
## Project Deliverables

Two national scientific presentations (80 attending)

Four regional scientific presentations (180 attending)

Two regional producer/consultant presentations (150 attending)

	2017	2018
AP	110.14	107.62
CC	154.71	110.62
CR	91.85	116.46
NTNC	185.10	98.30
RTNC	164.82	116.49
TR	170.43	119.91



	gallons	
	2017	2018
AP	441.1	438.8
CC	426.8	410.4
CR	449.1	428
NTNC	469.8	353.1
RTNC	437.8	434.9
TR	467	409.7

