



Mississippi Corn Promotion Board 2025 Progress Report



Project Title: Delayed Timing for Spring Application of N in corn
PI: Vaughn Reed; Corey Bryant
Department: Plant and Soil Science

Project Summary (Issue/Response)

One of the main limiting factors for planting season in the spring is how soon can you get into the field to plant. For this reason, many producers may look to apply nutrients early (fall or early spring applied) in order to stay on time for planting season. Dr. Erick Larson reports that optimum grain yields are produced in corn planted up to May 1, then yields start declining. In years where we would have late springs, producers aren't always able to get all fields planted and with some baseline of N fertilizer applied in a timely manner. Studies in other crops such as wheat have shown that by delaying N on into the season, we can produce just as much yield, or even increase yield, while also increasing nitrogen use efficiency (NUE) (Souza et al., 2022). Other works have also suggested that the majority of N uptake doesn't occur until after V6, while peak uptake occurs from V10-V18 (Bender et al., 2013). Applying the N at the most optimum time, even delaying the side-dress application later into the season, could lead to less N being used to maximize yield, which could be beneficial for both financial and environmental purposes, while also leaving more time focusing on getting the seed in the ground.

Currently MSU recommendations suggest split application of N to reduce losses, with the bulk of application occurring prior to peak uptake. In a perfect situation, all corn would be fertilized in a timely fashion, but many times, rainfall and the environment could delay application of N.

Project Results/Outcomes

This study was implemented over 4 locations in 2025, at North Farm in Starkville, Brooksville, Pontotoc Research Station in Pontotoc, and Verona Research Station. Nitrogen treatments were split between 2 timings: the first being every growth stages from planting to V10, and the second timing ranging from V10 to V16/R1. Poor growing conditions throughout the state led to below average yields than we were hoping for, with an average around 150 bu ac⁻¹ across all locations.

Figure 1 to the right investigates the timing of the first Nitrogen application from this study. Across all 4 locations, as long as the first N application was applied by V6, we maximized yields. This backs up what we currently know about N management, that early season N isn't always required, specifically at planting. We can delay that first application a little later into the season.

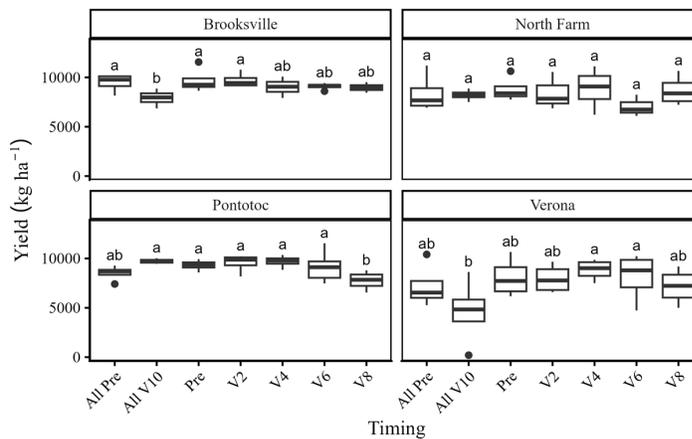


Figure 1. Treatment Yields from all locations based on the timing of the first N application, ranging from pre-plant to V8.

Project Results

Figure 2 investigates the timing of the second N application from this study. Based on limited responses, we believe that delaying the second application as late as V12/V14 could still maintain yields. This is obviously heavily reliant on the weather, and the ability to get that N application out in the field at such a late growth stage.

Future analysis will be based on bringing in rainfall data, to determine if/what kind of impact rainfall has. We suspect that the rainfall aspect of N application is more important than the actual timing. Getting the N into the ground in a timely manner will have more of an impact on yield.

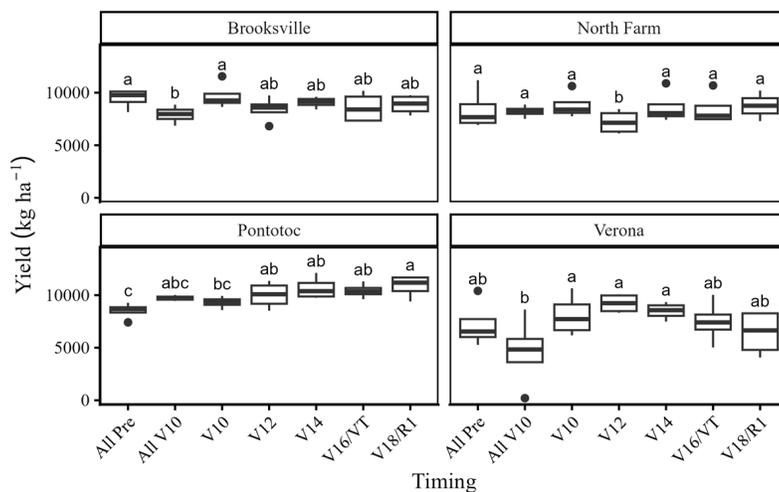


Figure 2. Yields for the second set of timings, ranging from V10 to V16/V18/R1.

Project Impacts/Benefits

This study will provide producers insurance on being able to maintain yields, even if a N application isn't made until later in the season than usual. It is well known that increasing Nitrogen use efficiency is possible by applying N at the best timings, where N uptake is the greatest. This work should provide evidence of delaying the first and second N applications to opportune moments.

Project Deliverables

This study was discussed at the 2025 NMREC Field Day. Findings and treatment structure of this project were also presented at the 2025 Nitrogen Use Efficiency Workshop in Ames, IA. This project was supposed to be discussed at the 2025 Tri-Societies Meeting in Salt Lake City, Utah, however, due to weather and travel problems, we were unable to attend. It is our goal that after the final year of this project (2026-2027), we will publish blogs, fact sheets, and refereed manuscripts denoting our findings.

Additional Questions

1. What value does this research give the grower? Describe any financial decision-making tools your project provides.

As noted prior, this research will provide evidence to avenues for increasing N use efficiency further by delaying the timing of N applications to times of greatest uptake. This will either i) increase yields by applying N when it is required, or ii) decrease input costs by increasing how far each lb will go for the crop. While there will not be any economic analysis attributed to this study, this will be an additional tool in the toolbox for producers.

3. List other sources of funding you have acquired over the past 2 calendar years.

For corn studies, I have acquired funding from the following:

- OCP North America
- NRCS-CIG
- Fluid Fertilizer Foundation/The Fertilizer Institute
- Mississippi Corn Promotion Board
- Private industry