

EFFECTS OF NITROGEN APPLICATION STRATEGY ON CORN

TRIAL OVERVIEW

- Farmers are constantly looking for information on how to be more efficient with farm inputs.
- Nitrogen (N) is an input that provides many options relating to application strategy that can affect the efficient use of the material.
- The use of irrigation systems to apply N can be a very cost effective application method, because it allows for a delay in N investment.

RESEARCH OBJECTIVE

- The research was set up to determine what effects the N application strategy had on corn.
- Specifically, whether higher yields result from putting N on before planting, with split applications between planting and irrigation, or applying all of the N through irrigation.

Location	Soil	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield/Acre	Planting Rate/Acre
Gothenburg, NE	Silt Loam	Corn	Strip-till	05/25/2016	10/10/2016	240	36,000

SITE NOTES:

- The trial was set up as a randomized complete block with 3 replications of 4 treatments.
- All treatments had a strip-till base application of 40 lbs/acre of phosphorus (P) as 10-34-0 which also supplied 12 lbs/acre nitrogen (N) on April 14, 2016.
- At this time the 60 and 120 lb/acre of preplant N treatments were also applied with the strip-tiller.
- The site was irrigated with subsurface drip irrigation and in-season fertilizer was applied through drip irrigation.
- Nitrogen application through irrigation started 6 to 10 days before the corn required irrigation for water purposes.
- Soil test results determined nitrate level was 101 lbs/acre, organic matter was 4%, and soil pH 6.7 with a cation exchange capacity of 18.2.

UNDERSTANDING THE RESULTS

No.	Treatment	At Planting Application	Nitrogen Applications Through Irrigation							
			July 9	July 13	July 21	July 22	July 30	July 31	August 5	August 6
1	120 lbs/acre N at planting	April 14	-	-	-	-	-	-	-	-
2	120 lbs/acre N through irrigation	-	15	15	15	15	15	15	15	
3	60 lbs/acre N at planting; 60 lbs/acre N through irrigation	April 14	-	15	-	15	-	15	-	15
4	60 lbs/acre N at planting with stabilizer; 60 lbs/acre N through irrigation	April 14	-	15	-	15	-	15	-	15

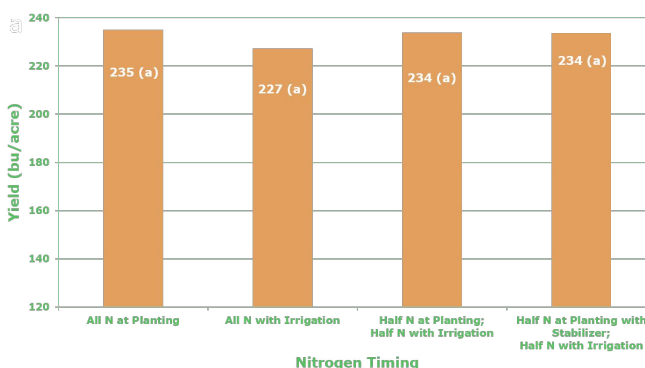


Figure 1. Corn Yields Based on Nitrogen Application Across Treatments. No treatments were significantly different at the P=0.10 level.

- The corn had improved stalk diameter because it had more vigorous early-season growth when the majority of N was applied at the beginning of the growing season. The growth effect did not significantly influence yield even in treatments when all the N applications were delayed to growing season applications (Figures 1 and 2).
- Treatments with N applications after planting had less vigorous early-season growth.

WHAT DOES THIS MEAN FOR YOUR FARM?

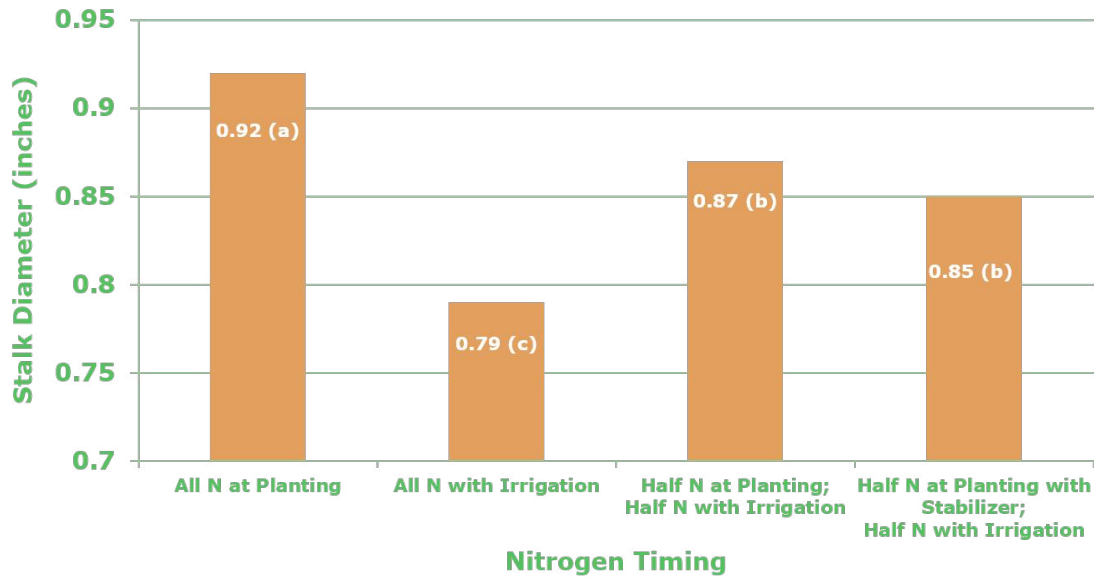


Figure 2. Stalk Diameters and Differences at the P=0.10 Level.



Figure 3. Late-season nitrogen stress in Treatment #1 where all of the nitrogen was applied at planting.



Figure 4. Corn with less late-season nitrogen stress (leaf chlorosis and necrosis) was shown at the end of the season when all the nitrogen was applied later through irrigation.

- Nitrogen applications through irrigation are an effective tool to manage N. -These N applications did not lead to greater yields in this study, but they did provide yields that were similar to applying all of the fertilizer at planting.
- Applying all of the N at or near planting can be risky because excessive rainfall could result in leaching. -Nitrogen losses result in costly reapplication and rescue treatments required to meet corn needs later in the growing season.
- If corn is N stressed early in the growing season continue to monitor the field and consider management with sidedress or rescue treatments.
- In this study, corn reached yield potential similar to the greatest-yielding treatment. This was true even for the first N applications in the late vegetative stage of corn development.

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