



Nebraska On-Farm Research Network

UNL Pre-Plant Corn Nitrogen Recommendation vs. UNL Nitrogen Recommendation Variable Rate

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Objective: Verify that the N rate can be profitably varied according to recent yield history of the field.

Rationale: UNL research consistently confirms that when N is considered to be non-limiting to crop growth, each addition of N fertilizer results in less yield gain. This results in lower N use efficiency and lower net return. This is attributed, at least partly, to the high N use efficiency possible with crops that have healthy and well-developed root systems efficient in nutrient recovery and have plants that are efficient in converting nutrients and carbohydrates to yield (i.e. internal or physiological efficiency). The UNL N recommendation has been **validated** for maximizing profitability for high yielding environments (i.e. >240 bu/ac), as well as lower yield environments over diverse production situations. However, many producers feel that N in excess of the recommendations is needed; this results in reduced profitability and more N loss to the environment. Additionally, applying a portion of total N fertilizer during the growing season (sidedress) has been shown to improve nitrogen use efficiency (NUE).

Procedure: The two treatments in these trials are:

Treatment 1: UNL N recommendation with yield goal set using field average

Treatment 2: UNL N recommendation varied by adjusting expected yield goal based on at least 2 years of historical yield data.

This trial requires variable rate N application capability and yield mapping. Residual nitrate-nitrogen sample is required for the UNL N recommendation.

The UNL nitrogen rate can be determined using the following [spreadsheet](#) (use the tabs at the bottom of the spreadsheet for help and instructions). (If link does not work visit the www.cropwatch.unl.edu/farmresearch and click on the research protocols page.)

Treatment Design: With two treatments for this trial we are able to use the paired comparison design below. A total of 7 replications should be implemented and harvested. The same hybrid and management practices (other than N) should be used across the entire study area.

Replication	N Application	Harvest
Rep 1	Treatment 1: UNL N Rate calculated with field average for yield goal	← Record Yield
	Treatment 2: UNL N Rate with varied yield goal based on 2+ years historic yield differences	← Record Yield
Rep 2	Treatment 2: UNL N Rate with varied yield goal based on 2+ years historic yield differences	← Record Yield
	Treatment 1: UNL N Rate calculated with field average for yield goal	← Record Yield
Rep 3	Treatment 1: UNL N Rate calculated with field average for yield goal	← Record Yield
	Treatment 2: UNL N Rate with varied yield goal based on 2+ years historic yield differences	← Record Yield
Rep 4	Treatment 2: UNL N Rate with varied yield goal based on 2+ years historic yield differences	← Record Yield
	Treatment 1: UNL N Rate calculated with field average for yield goal	← Record Yield
Rep 5	Treatment 1: UNL N Rate calculated with field average for yield goal	← Record Yield
	Treatment 2: UNL N Rate with varied yield goal based on 2+ years historic yield differences	← Record Yield
Rep 6	Treatment 2: UNL N Rate with varied yield goal based on 2+ years historic yield differences	← Record Yield
	Treatment 1: UNL N Rate calculated with field average for yield goal	← Record Yield
Rep 7	Treatment 1: UNL N Rate calculated with field average for yield goal	← Record Yield
	Treatment 2: UNL N Rate with varied yield goal based on 2+ years historic yield differences	← Record Yield

Grower Requirements:

1. Flag or **mark** GPS location of each treatment.
2. Provide all necessary **inputs** for crop production.
3. Complete a **background** agronomic form about site and practices.
4. Collect **yield data** and **grain moisture** with weigh wagon or yield monitor. If using yield monitor, please designate a separate “load” for each treatment and set up separate “products” names for each treatment harvested. Yield monitor must be **well calibrated**. Contact UNL Extension if assistance with this process is needed.
5. Collect stand counts at harvest. Each treatment in all replications should have a stand count recorded. It is recommended that at least 3 counts be averaged together for each reported stand count.
6. Submit harvest data to UNL Extension within 30 days of harvest or by Dec. 15 of the harvest year.
7. Allow UNL Extension to use submitted and collected data for research, educational, and informational purposes.

Nebraska On-Farm Research Network will:

1. Provide technical assistance in setting up replicated and randomized experimental design.
2. Provide assistance upon request with treatment implementation, flagging, stand counts, stalk rot tests, and recording yield.
3. Analyze raw data using statistical analysis and provide this information to the grower.

For assistance with studies, please contact Laura Thompson: laura.thompson@unl.edu or 402-245-2224
Or your local educator

Disclaimer: The Nebraska On-Farm Research Network does not endorse the use of products tested in on-farm replicated strip trials. While treatments are replicated within trials and may be replicated across multiple sites under various conditions, your individual results may vary.

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