Fall vs. Spring Applied Anhydrous with and without Nitrification Inhibitor

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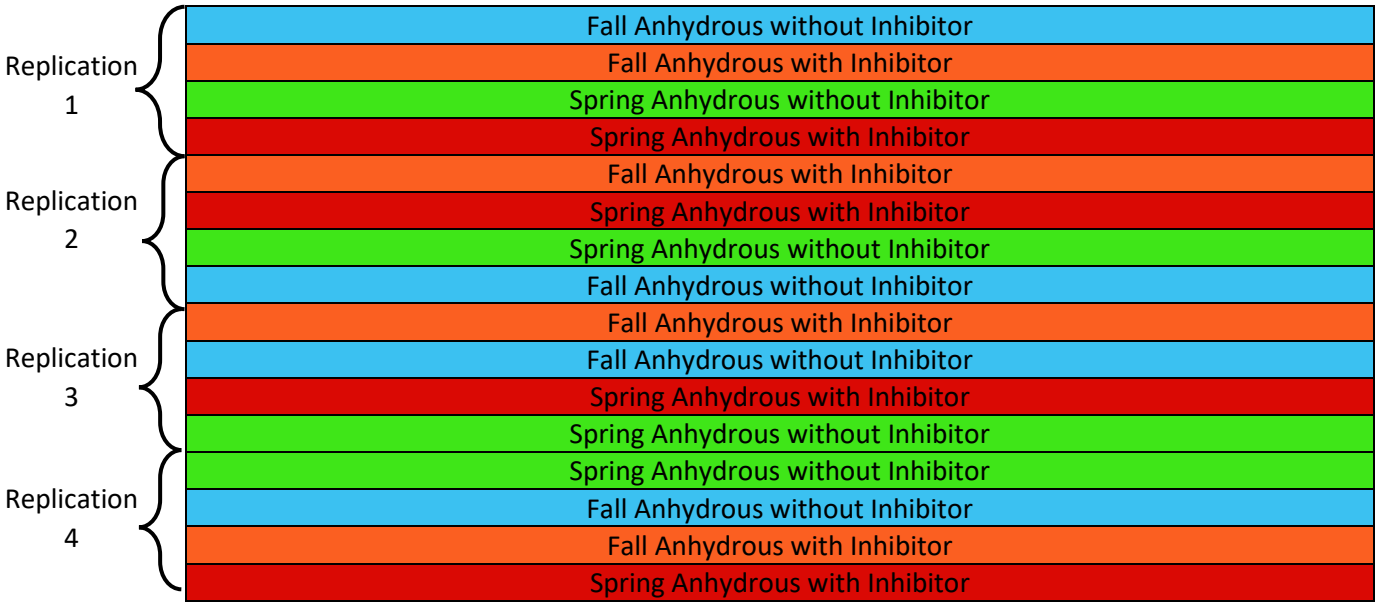
Objective: The objective of this study is to evaluate the effects of fall versus spring applied anhydrous ammonia with nitrification inhibitors on nitrogen retention, NO_3 leaching, crop yield and profits.

Rationale: Large amounts of precipitation received in the fall and/or spring can increase the potential of fall or spring applied anhydrous ammonia to be converted to nitrate and be lost via leaching. Nitrification inhibitors can inhibit the conversion of ammonium to nitrate and decrease the risk of nitrogen loss. However, fall-applied inhibitors may not remain efficient till May or June when the chances of NO_3 leaching are high, thus reducing the crop yield potential. Comparatively, the application of anhydrous ammonia with nitrification inhibitors at pre-plant can be more effective in reducing nitrogen losses while increasing the crop yield potential and profits. Growers applying anhydrous ammonia in the fall or spring may be interested in or required by local Natural Resources Districts (NRDs) to utilize a nitrification inhibitor with anhydrous application. This protocol allows growers to test any nitrogen retention differences and yield effects of utilizing a nitrification inhibitor product. More information about nitrogen inhibitors can be found in the following CropWatch article: https://cropwatch.unl.edu/2019/nitrogen-inhibitors-improved-fertilizer-use-efficiency

Treatment Design: The following is a four treatment design. At least 3 replications are needed for this study (4 are preferred). The same hybrid and management practices should be used across the entire study area.

Treatments:

A: Fall Anhydrous without Inhibitor
B: Fall Anhydrous with Inhibitor
C: Spring Anhydrous without Inhibitor
D: Spring Anhydrous with Inhibitor



Data collection:

1. Early season stand counts for each strip.
2. Yield for each strip via weigh wagon or yield monitor. If using a yield monitor, the monitor must be well calibrated. Grain moisture should also be recorded.
3. Pre-season soil sampling for complete nutrient analysis at 0-8" depth.
4. In mid-May (target May 15) soil samples will be taken at depths of 0-12" and, if possible, 12-24". The 12-24" sampling depth is especially important when there is a wet spring and with comparisons of fall versus spring application. Samples will be taken 2" from the anhydrous band. A total of 12 cores will be in the composite sample. Samples will be analyzed for ammonium and nitrate.
5. In late-May (target May 30) soil samples will be taken at depths of 0-12", 12-24", and 24-36" (if possible to sample this deep). Samples will be taken 2" from the anhydrous band. A total of 12 cores will be in the composite sample at 0-12"; a total of 6 cores will be in each composite sample at 12-24" and 24-36" if a regular soil probe is used. (NOTE: If a Giddings probe will be used for 12-24" and 24-36" samples, only 4 cores are necessary at those depths for each composite sample. The surface 0-12" sample should be taken with a regular soil probe and contain 12 cores for the composite sample). Samples will be analyzed for ammonium and nitrate.
6. Aerial NDVI imagery will be obtained throughout the growing season (approximately 12 dates) to observe visual crop canopy differences.
7. Site rainfall records will be obtained from interpolated radar estimates.
8. Other information including soil type as defined by USDA, previous tillage conditions, hybrid planted, tillage system, residue type, planting depth, and others will be required to be provided by the grower.

Grower Requirements:

1. Flag or mark GPS location of each treatment.
2. Provide all necessary inputs for crop production.
3. Complete background agronomic form about site and practices.
4. Collect yield data and grain moisture with weight wagon or yield monitor. Yield monitor must be **well calibrated**. Contact UNL Extension if assistance with this process is needed.
5. Submit harvest data to Nebraska Extension within 30 days of harvest or by Dec. 15.
6. Allow Nebraska 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, and recording yield.
3. Analyze raw data using statistical analysis and provide this information to the grower.

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.