

Schertz Aerial Service, Inc.

~Enhancing Central Illinois Agriculture for Forty Years~



Corn Excellence ProgramTM

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Schertz Aerial Service, Inc. is pleased to offer an aerial broadcast of Ammonium Nitrate fertilizer in 2011. It is positioned as a supplement to enhance a balanced fertility program. We believe that an application of ammonium nitrate will enhance stalk strength and fungicide results to be a key part of our Corn Excellence Program™. The following information is a summary of research articles that support our position that this will be a valuable addition to corn production.

Anhydrous ammonia injected and ammonium nitrate broadcast tended to be best performers across three locations of a continuous no-till corn/soybean rotation.

Nitrogen source	Placement	Corn yield ¹
Ammonium nitrate (34-0-0)	broadcast	163 bushels per acre
Anhydrous ammonia (82-0-0)	knifed	160 bushels per acre
UAN solution (32-0-0)	knifed	156 bushels per acre
Urea (46-0-0)	broadcast	149 bushels per acre
UAN solution (32-0-0)	1/3 broadcast, 2/3 knifed	134 bushels per acre

¹1991-1992 average of three Missouri locations with 180 pounds N/A

With crop residues on the soil surface, ammonium nitrate is the best nitrogen fertilizer for broadcasting without incorporation. Recent data collected during a three-year period at northern Missouri locations shows the superiority of ammonium nitrate as a broadcast source in a corn/soybean rotation system. In heavy crop residues of continuous no-till corn, differences between broadcast N sources tend to be amplified, with ammonium nitrate again being the best choice.

Nitrogen source	Corn yield ¹
Ammonium nitrate (34-0-0)	149
Urea (46-0-0)	142
UAN solution (32-0-0)	132

¹Average across eight site years in Missouri

In fact, no tillage research studies in Missouri and Tennessee show UAN-solution and urea broadcast on the soil surface reduced corn yield potential 9 to 23 percent compared to ammonium nitrate broadcast, N-soil injected, or anhydrous ammonia injected.



Nitrogen and its Importance

Nitrification is the conversion of ammonium nitrogen (NH_4-N) to nitrate nitrogen (NO_3-N) in the soil. Inhibiting nitrification is important because nitrogen in the NH_4-N form is held tightly by the soil particles and is not subject to leaching or denitrification loss. Leaching is when NO_3-N is moved deeper into the soil profile by moving water. Denitrification occurs when NO_3-N is converted into a gas and escapes into the atmosphere. It occurs primarily when the soil is water-saturated. Therefore, losses are usually highest for N applied early in the spring. Later, side-dressed applications usually result in very little denitrification loss, since soil saturation is less likely.

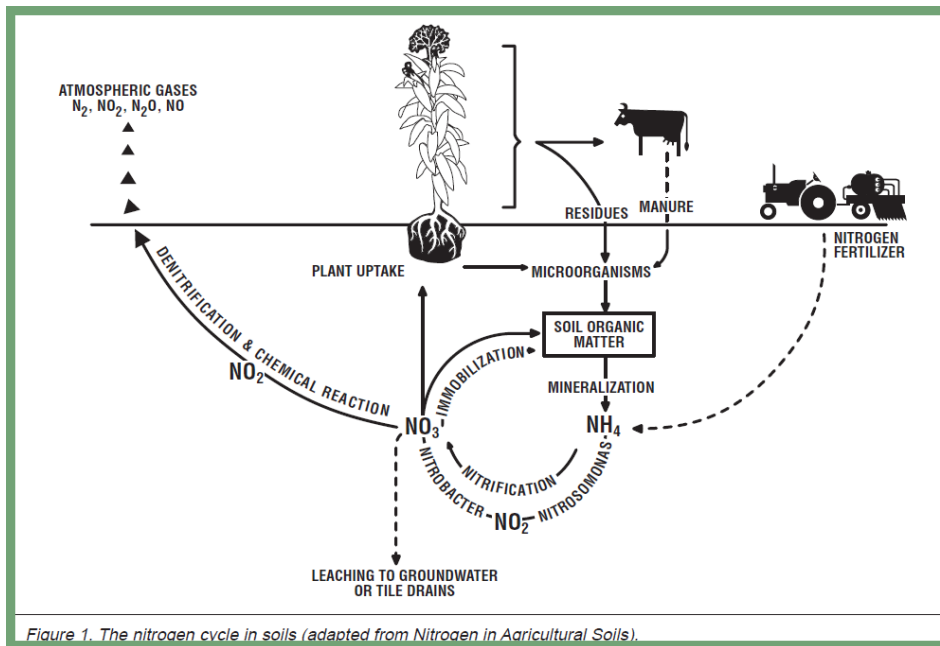
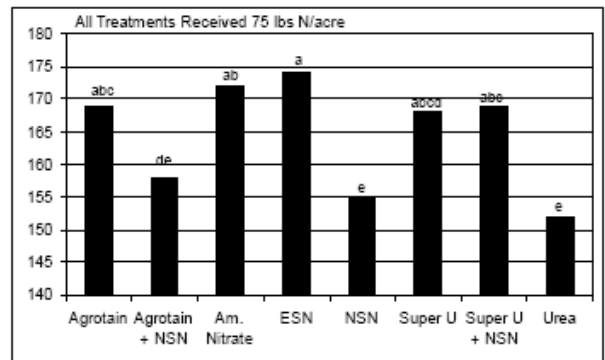


Figure 1. The nitrogen cycle in soils (adapted from Nitrogen in Agricultural Soils).

Volatilization losses depend on the environmental conditions at the time of application. Soil temperature, soil moisture, amount of surface residue, soil pH, and length of time between application and the first rain event or irrigation are all factors that determine the total amount of N that could be lost via volatilization. These losses are highest when the soil is warm (above 60°F), experiencing high evaporation rates, and/or when soil pH is greater than seven.

2007 N volatilization Study (Princeton, KY)





Stabilizers & Other Forms of N

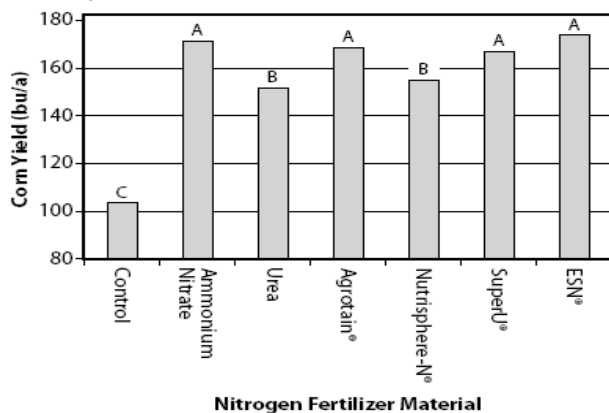
Urea, a form of nitrogen, is used on wheat and occasionally corn in the Midwest. It is limited in desirability for top dressing, since it is very subject to volatilization and residue tie up. Yield was substantially lower for the urea and UAN treatments when compared to the ammonium nitrate application. (Treatment: Ammonium Nitrate. Yield (bu/a): 192 b.)

ESN is a slow release form of urea that will typically not be available to the plant for some time. Applications of ESN later in the spring are not recommended because the slow release appears to reduce yield. In comparative studies, ammonium nitrate has produced corn yields higher than broadcast urea in years when significant urea loss occurred.

In research on improving nitrogen availability through nitrogen inhibitors, the availability of nitrogen during the vegetative growth stages has reduced the severity of *Diplodia* and *Gibberella* stalk rots of corn, likely because of altered nitrogen metabolism in plants assimilating the ammonium form of Nitrogen. Corn stalks in areas receiving adequate available nitrogen tend to remain green later in the growing season and have thicker rinds, both of which reduce pathogen effects and lodging. Grain moisture content at harvest is unaffected. Late side-dress injections of N may reduce yield through mechanical damage to the root system and increased root rot. Immobilization of late-season applied nitrogen with nitrogen inhibitors may further exacerbate this condition. There is a good probability of obtaining a yield increase from application of readily available nitrogen to assist fall-applied ammonia fertilizers in the eastern Cornbelt because of the potential for nitrogen unavailability that may be associated with fall applications.

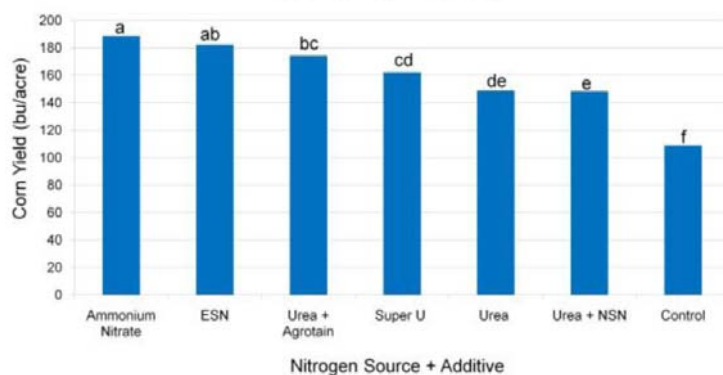


Figure 4. The effect of nitrogen fertilizer material on corn grain yield at Princeton in 2007 (bars with the same letters are not significantly different: p<0.10).



Nitrogen Stabilizers

2009 Corn (Princeton)



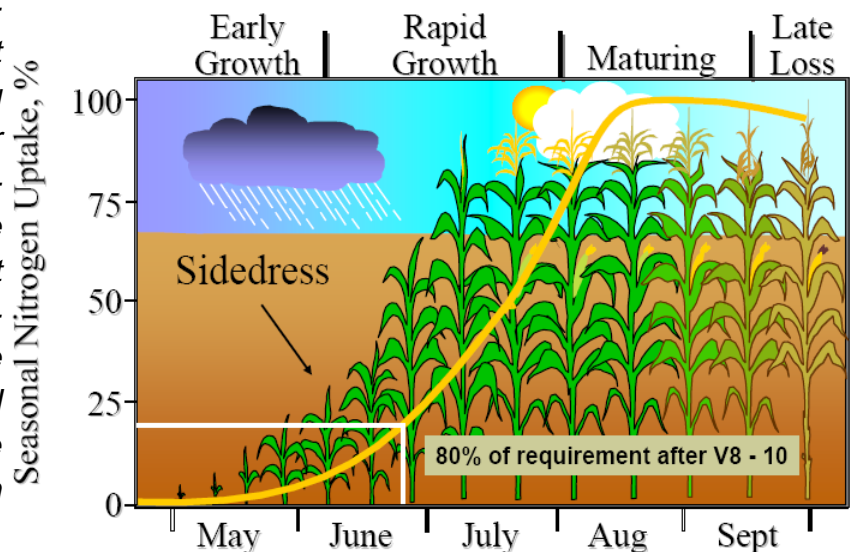
Timing

The quest for maximum corn yields and farm profitability is limited by many things including the interactions of: weather, soil attributes, genetic potential of the seed, planting populations, fertility, crop protection inputs, etc. Our plots have shown that fungicides, fertilizer, and planting population have a synergistic effect on corn yields. However; if anyone of these inputs is not optimized overall, yields/margins can be inconsistent. There have been attempts to supplement nitrogen to corn late in the season by foliar applied nitrogen solutions, which have marginal positive results, in our experience.

Ammonium nitrate is a pH balanced form of nitrogen fertilizer that is extremely water soluble, and it is not tied up by soil organic residue. What makes the ammonium nitrate significant is half of the nitrogen is in the ammonium form and the other half is in nitrate form. Results have shown that many crops do respond well to nitrogen supplied by this product. It is all immediately available and will take very little moisture to get it to the top corn roots. The content of nitrogen in ammonium nitrate ranges from 30% to 34.5%. By applying the suggested 90 pounds of ammonium nitrate we configured that there will be approximately 30 pounds of additional N supplied to the plant during the rapid growth stage.

Nitrogen must be available to the corn plant when it can utilize it. If nitrogen is not in an available form at the time of need, the lack of available nitrogen becomes a yield limiting factor. The vast majority of the nitrogen is required after V8, known as the grand stage of growth, Many factors can limit the access to previously provided nitrogen. The soil contains vast quantities of nitrogen which is unavailable to the plant due to the form that it is in or being beyond the root zone. In water logged soils, denitrification can remove available nitrogen rapidly. The last several years have indicated that the lack of available nitrogen is a major yield limiting factor. We believe that by adding a readily available and non-volatile nitrogen source for the corn plant's requirements will assist in maximizing the yield potential.

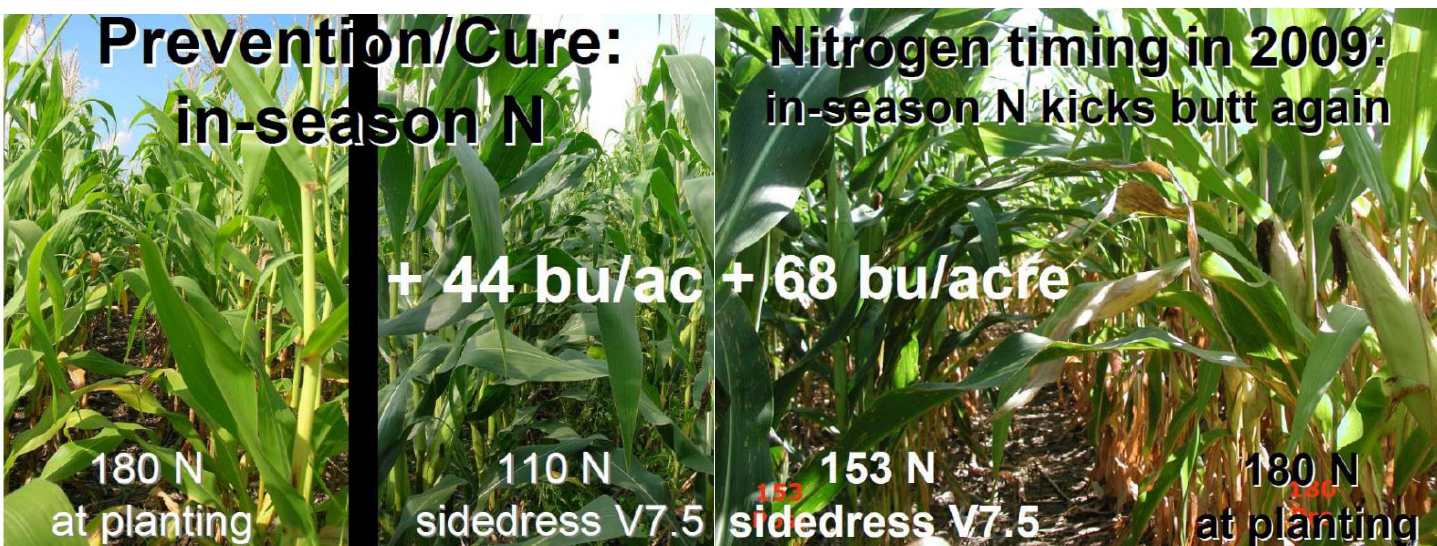
Crop Growth and N-Uptake





Research

- “Two sources of granular nitrogen fertilizer are generally most feasible for mid-season topdress application on corn—ammonium nitrate and urea. Ammonium nitrate is generally the preferred nitrogen source because it is not subject to volatilize, compared to urea.” (Erick Larson, Mississippi State University, 2010)
- Average over 39 corn studies in Missouri, ammonium nitrate out yielded urea by an average of 14 bu/acre and 25 bu/acre more than UAN covering 20 experiments. (University of Missouri)
- The average yields of the study showed ammonium nitrate produced higher yields at a much lower nitrogen rate than other sources. This saves the producer money and protects the environment. (Donald D. Howard, University of Tennessee, 2001)
- If surface-broadcast applications with no-till are necessary, ammonium nitrate should be the preferred nitrogen source. (John A. Stecker, Department of Agronomy, University of Missouri, 1993)
- “Ammonium nitrate is not subject to loss by the volatilization process” (John A. Stecker, Department of Agronomy, University of Missouri, 1993)





At Schertz Aerial Service, Inc., we strive to increase growers' yields as efficiently and effectively as possible. We are proud to have this unique offer that allows a plant to have readily available nitrogen at the time of need. We will be offering the application of ammonium nitrate between V5 and the V10 stage.

If apply Ammonium Nitrate (90#) and follow with any fungicide on same amount of acres, will earn a \$2.00 per acre rebate from Schertz Aerial Service. Rebate for the Corn Excellence Program™ will only be applied if an Information Redemption Form is filled out and signed.**

Syngenta will provide an additional \$2.00 per acre rebate which will be paid by Schertz Aerial Service if the fungicide applied is either Quilt, Quilt Xcel or Quadris.

BASF will provide an additional \$2.00 per acre rebate if Headline or Headline AMP is applied in which the rebate will be paid by Schertz Aerial Service.



Therefore, whether you have 20" rows, 30" rows, twin rows, no-till, have a significant loss in nitrogen, or just trying to reach that record-setting bushel per acres, a late application of ammonium nitrate may just be the answer for you.

***** A legible copy of a valid State driver's license photo identification, current physical address and telephone number is required.***





Summary

Over the years there has been a deficiency in nitrogen during a plants' time of need. Schertz Aerial Service, Inc. has chosen ammonium nitrate because it will be immediately available to the plant with minimal volatilization. We also acknowledge the difficulty in side-dressing 20" row corn and allowing those plants to get corn at a later stage.

- No pruning to root mass
- No damage to field
- No compaction issues
- Some cosmetic burning or bleaching to leaves
- Makes up for the N loss in cool, wet soils
- Increased yield potential
- N applied at the time of greatest demand in corn plants
- Not tied up in organic matter



Sources and Other Useful Articles:

Eldorado Chemical Company - ARA 2011 Winter Meeting Presentation by Larry Fitzwater and Phil Gough

Fertilizer Management for No-Till Corn and Grain Sorghum in Missouri - Harry C Minor and John Stecker, Department of Agronomy; and J R Brown, School of Natural Resources, University of Missouri Extension (Revised May 1984)

Fertilizer Manual - UNIDO, International Fertilizer Development Center (1998)

Grain Crops Update, Corn Nitrogen Suggestions – Erick Larson and Larry Oldham, Mississippi State University Extension Service (Dated April 9, 2010)

Handbook of Inorganic Chemicals — Pradyot Patnaik. McGraw-Hill. (2003)

National Corn Handbook, Nitrification Inhibitors for Corn Production – D W Nelson, University of Nebraska and D Huber, Purdue University, Iowa State University Extension (Revised February 1992)

Nitrogen Fertilizers in No-Till Corn Production – Donald J Eckert, Professor, Natural Resources, Ohio State University Extension

Nitrogen Transformation Inhibitors and Controlled Release Urea – G J Schwab and L W Murdock, Department of Plant and Soil Sciences, University of Kentucky (Issued April 2010)

Slow Release and Enhanced-Efficiency N Materials: Where Do They Fit? - Dr Terry Tindall, J R Simplot, Boise, ID – (Dated 2008)

Using N Stabilizers and Slow Release Products – Greg Schwab, Extension Soil Specialist, Nitrogen Management, University of Kentucky (Dated December 2009)



Schertz Aerial Service, Inc.

Information Redemption Form

In compliance with the Corn Excellence Program™ and Soybean Excellence Program™ rebates, we require a collection of information in regard to the applied acres and/or acres within the field that are considered checks. The collection of this data will help Schertz Aerial Service (SAS), to better serve you in the future along with publishing a collection of information to the public. All personal identification including, but not limited to; grower name, field name, specific locations and addresses will remain confidential between SAS and the grower. Yields may be published as an average or individually for marketing purposes.

Date: _____ Please circle product(s) used: **Ammonium Nitrate / Potassium Nitrate**

Grower Name: _____

Field Name: _____ 2012 Crop: _____

County: _____ Township: _____ Section: _____

Acres with Nitrate Fertilizer: _____ Acres without Nitrate Fertilizer: _____

Planting Population: _____ Row Spacing: _____

Variety/Hybrid: _____

(Planting map if available)

Field History:

2011 Crop: _____

Tillage Practice: Fall: _____ Spring: _____

Fertilizer: (Please specify product and units)

Fall Applied: Nitrogen: _____ N-Serve: _____

Potassium: _____ Phosphorus: _____

Spring Applied: Nitrogen: _____

Potassium: _____ Phosphorus: _____

Starter Fertilizer: _____

Applications:

Nitrate Fertilizer:

Date applied: _____ Stage of Crop at application: _____ Rate Applied: _____

Fungicide: Product: _____

Date applied: _____ Stage of Crop at application: _____ Rate Applied: _____

Diseases & Pressure: _____

Pesticide: Product: _____

Date applied: _____ Stage of Crop at application: _____ Rate Applied: _____

Insects & Pressure: _____

Yield Data must also be collected in order to receive the Cash Discount Allowance Amount. Data collected by weigh wagon is encouraged or elevator scale ticket.

Schertz Aerial Service, Inc.

Information Redemption Form – Yield Data

In compliance with the Corn Excellence Program™ and Soybean Excellence Program™ rebates, we require a collection of information in regard to the applied acres and/or acres within the field that are considered checks. The collection of this data will help Schertz Aerial Service (SAS), to better serve you in the future along with publishing a collection of information to the public. All personal identification including, but not limited to; grower name, field name, specific locations and addresses will remain confidential between SAS and the grower. Yields may be published as an average or individually for marketing purposes.

Harvest Date: _____
Grower Name: _____
Field Name: _____ 2012 Crop: _____
County: _____ Township: _____ Section: _____
Acres with Nitrate Fertilizer: _____ Acres without Nitrate Fertilizer: _____
Number of Rows Harvested: _____ Row Width: _____
Distance of Harvested Rows: _____

Yield Collected from Weigh Wagon:

With Nitrate Fertilizer:
Moisture: _____ Moisture: _____ Moisture: _____
Yield: _____ Yield: _____ Yield: _____
Test Weight: _____ Test Weight: _____ Test Weight: _____

Without Nitrate Fertilizer:
Moisture: _____ Moisture: _____ Moisture: _____
Yield: _____ Yield: _____ Yield: _____
Test Weight: _____ Test Weight: _____ Test Weight: _____

Yield monitor data is also requested upon availability.

Yield Collected Without Weigh Wagon:

**Calibrated Yield Monitor along with scale ticket and acres if available*

With Nitrate Fertilizer:
Avg. Moisture: _____ Avg. Yield: _____ Avg. Test Weight: _____

Without Nitrate Fertilizer:
Avg. Moisture: _____ Avg. Yield: _____ Avg. Test Weight: _____

Yield monitor data is required (i.e. yield map and shape file)

I, _____, allow Schertz Aerial Service to utilize and publish my data and yield map (if provided).

Signature: _____ Date: _____