Sulf-N® Ammonium Sulfate

# ADVANCING CORN YIELDS

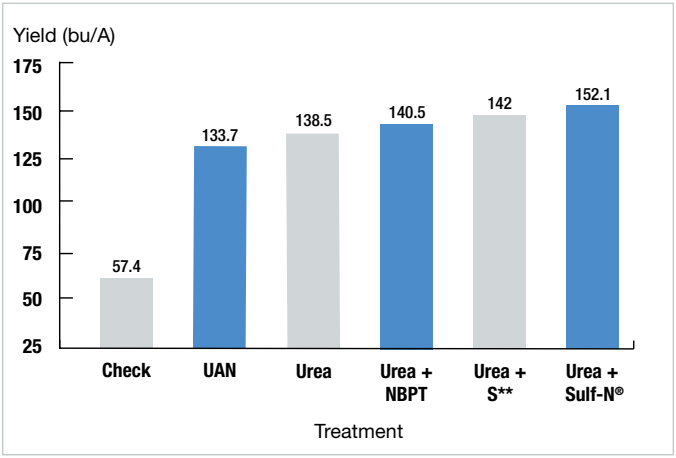
AdvanSix

## Maximize Profit Opportunities in Corn

- Earlier planting
- Reduced tillage
- Advanced seed genetics
- High performing hybrids
- Continuous cropping

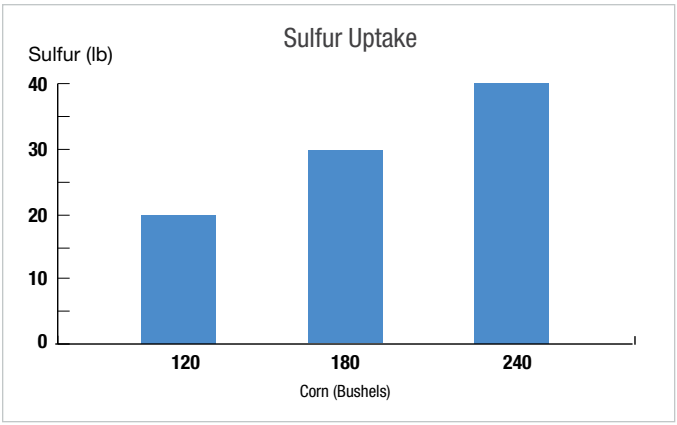
AdvanSix Sulf-N® ammonium sulfate fertilizers can help meet the challenges and maximize the profit opportunities of today's corn market. From sands and silt loams to clay soils, Sulf-N® fertilizers satisfy the growing need for sulfur (S) in today's soils by supplying ammonium, which is a more efficient and effective form of nitrogen (N).

## Sulf-N® Blends Boost Corn Yields




*Source: University of Maryland, 2006. 120 lb N/Acre @ 4-leaf stage*
** Sulf-N® ammonium sulfate @ 150 lb/A*
*** 80% finely ground elemental-S*

## More Corn, More Sulfur




*Source: International Plant Nutrition Institute*

## Discover the Benefits

### More Efficient Nitrogen

Sulf-N® ammonium nitrogen is the preferred form of nitrogen that resists N loss and maximizes plant uptake.

### Essential Sulfur

Corn needs one pound of sulfur for every 10 to 15 pounds of nitrogen. When the plant doesn't get enough sulfur, nitrogen efficiency also suffers.

### Works Without Incorporation

Resistance to volatilization makes Sulf-N® ammonium sulfate more efficient than urea and urea-ammonium-nitrate (UAN) solution for surface application in high residue systems like no-till or minimum-till, and topdress or sidedress applications.

### "Unlocks" Phosphorus

Ammonium-N improves availability and uptake of phosphorus, which is especially important where phosphorus rates are restricted. In university testing, corn starters made with ammonium sulfate performed as well or better than high-phosphate blends, whether dry or liquid.

### University Proven

Sulf-N® fertilizers have been proven in university studies to increase corn yield and profitability across a broad range of field and crop conditions.

### AdvanSix Quality

Sulf-N® fertilizers are produced by AdvanSix, the world's largest single-site producer of ammonium sulfate and a global leader in agronomic research and promotion.

## Higher Corn Yields Have Higher Sulfur Requirements

Yield loss from sulfur deficiency in corn typically begins at 21 days after emergence, with a one- to two- bushel yield loss for every day that follows.

Early planting reduced tillage and continuous cropping result in cooler soil temperatures that slow the microbial reactions necessary for the release of sulfur from organic matter. Even in more fertile soils, these conditions increase the risk of sulfur deficiency during critical early growth stages.

Ammonium sulfate in a preplant or starter application provides essential sulfur for early season corn growth. It encourages better emergence, faster maturity, and higher yields.

## Use the Form that Corn Roots Can Absorb

Sulfate is the only sulfur form that is readily available for root uptake. Elemental-S is not plant available until it converts to sulfate, which may take up to a few months. With 100% sulfate-S, ammonium sulfate is available to the plant as soon as it is applied.

### Elemental vs. Sulfate

| Treatment @ 120 lb/A | Bu/A |
|---|---|
| Check | 40.9 |
| Urea | 108.5 |
| Urea + S* | 103.5 |
| **Urea + Sulf-N**** | **127.4** |

*Source: University of Maryland, 1999-2001.*
*120 lb. N/A broadcast @ six-leaf stage on silt loam soil under no-till*
** Elemental-S*
*** Sulf-N® ammonium sulfate*

On-farm research trial of corn on Sparta fine loamy sand in northeast Iowa compares no sulfur fertilizer (right) with sulfur fertilizer treatment (left) demonstrating a healthy response to sulfur.

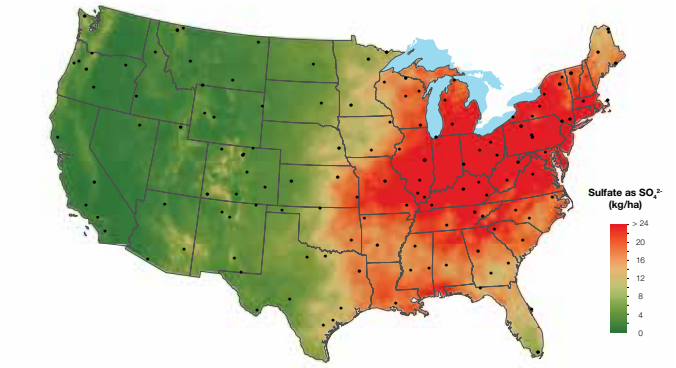
*Photo courtesy: B.Lang, Iowa State University Extension*

## Changing Sulfur Trends

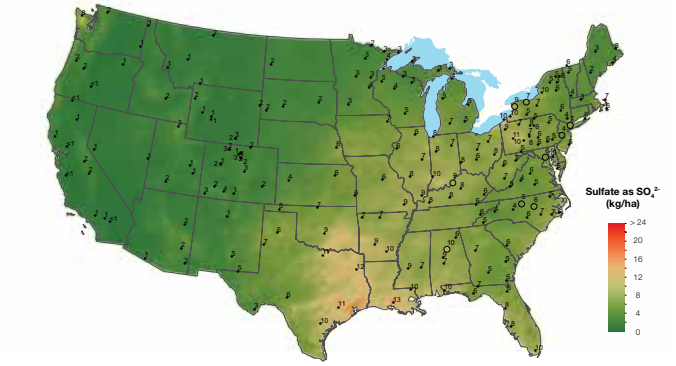
Air pollution control has drastically reduced the amount of “free” sulfur originating from industrial emissions and eventually landing in growers’ fields, a major reason why more sites and soil types are responding to sulfur fertilization.

### Sulfate Ion Wet Depositions, 1985 versus 2015

1985




2015




*National Atmospheric Deposition Program / National Trends Network, nadp.isws.illinois.edu*

## Research Highlights

Sulfur is not just for sandy soils anymore. Now heavier soils are also responding to sulfur.

### KANSAS

**Soil type:** silt loam (irrigated)
**Yield Advantage:** 9 bu/A
2003 - 2004
*Kansas State University*

### IOWA

**Soil types:** loam and silt loam (northeast)
**Yield advantage:** 15 bu/A
2007

**Soil types:** loamy sand and sandy loam (northeast)
**Yield advantage:** 25 bu/A
2007
*Iowa State University*

### MARYLAND

**Soil type:** silt loam
**Yield advantage:** 14.5 bu/A
2006
*University of Maryland*

### MINNESOTA

University of Minnesota
**Soil type:** silt loam (ridge-till)
**Yield advantage:** 17 bu/A
2001
*University of Minnesota*

### NEW YORK

**Soil type:** gravelly loam
**Yield advantage:** 0.3 T/A (silage)
2003
*Miner Institute*

## Ammonium-N Is the Preferred Form of Nitrogen for High-yielding Corn Hybrids

**In the soil,** ammonium sulfate resists nitrogen loss from volatilization, denitrification and leaching. It maintains a high level of efficiency even when surface-applied to heavy residue fields. Unlike urea and UAN solution, there is no need for timely rain or incorporation.

**In the plant,** ammonium nitrogen goes directly to amino acids and protein formation, saving valuable energy the plant may use for growth and resistance to adverse conditions. Nitrate-N, on the other hand, consumes energy for the two-step conversion to ammonium-N, before it may become part of a protein. Research has demonstrated how those extra steps draw plant energy away from important plant functions, finding fuller ears and higher yields when ammonium-N was taken up by the corn plant during its late vegetative growth.

### Ammonium Sulfate Improves N Efficiency

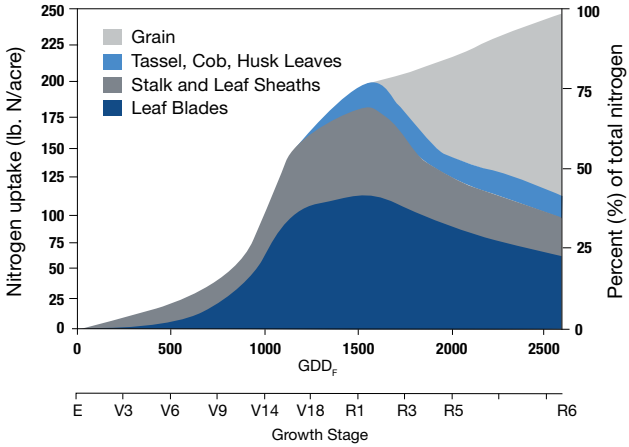
| Treatment @ 120 lb/A | Bu/A |
|---|---|
| Urea | 108.3 |
| Urea + NBPT | 116.9 |
| Urea + NBPT + DCD | 124.4 |
| **Urea + 200 lb Sulf-N*** | **126.9** |

*Source: University of Maryland, 2006.*
** Sulf-N® ammonium sulfate*

## Matching Nutritional Needs of Modern Hybrids

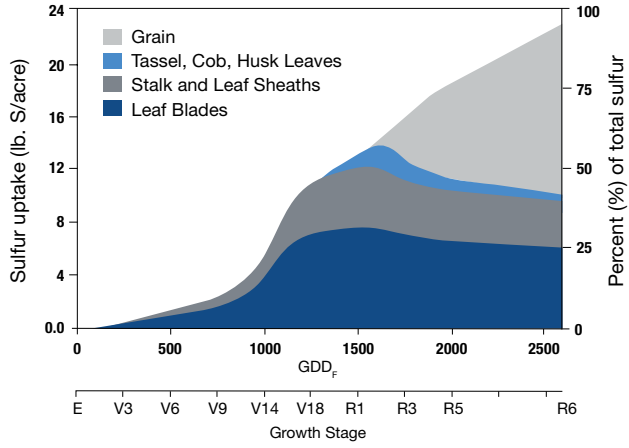
With the introduction of new corn genetics, researchers have found that nutrient uptake pattern and partitioning has also changed. University of Illinois data show that the post-flowering uptake of nitrogen and sulfur – two essential protein-building nutrients – is crucial for grain filling in modern hybrids (about 25% and 50% of total nitrogen and sulfur uptake, respectively). This points to the significance of applying an in-season top-dressing with ammonium sulfate, a non-volatile and immediately available source for those key nutrients.

### Partitioning of Nitrogen Uptake by Modern Corn Hybrids




*Data averaged across six hybrids in Champaign and DeKalb, IL, in 2010, University of Illinois. Agron. J., 105:161-170 (2013)*

### Partitioning of Sulfur Uptake by Modern Corn Hybrids




*Data averaged across six hybrids in Champaign and DeKalb, IL, in 2010, University of Illinois. Agron. J., 105:161-170 (2013)*

## Modern Spreaders

High clearance, high-capacity spreaders have made it possible to top-dress granular fertilizer well into the growing season. Ammonium sulfate, straight or in blends with urea, is an effective way to split-apply some of the nitrogen and sulfur to satisfy late-season crop needs.

New Leader G-4 Spreader

In corn field after corn field, the yield advantage goes to fertilizer programs that include Sulf-N® ammonium sulfate. Use it as recommended to help maximize the growing yield potential of today's high-performing hybrids.



PARTNER

**Contact AdvanSix**
To learn more about the benefits of Sulf-N® Ammonium Sulfate, visit **AdvanSix.com** or **SulfN.com** or call:
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