

**Supplement Your
Soybeans**

ADVANSix



2022 Harvest Report

We're advancing soybeans together.

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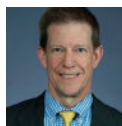
Supplement Your Soybeans 2022: Grower insights & results

The AdvanSix Supplement Your Soybeans program is all about practical innovation. Ammonium sulfate (AMS) is a time-tested, effective fertilizer that's essential to improving crop health, quality and yield. That's why we're partnering with progressive retailers and growers around the country to get a better feel for how AMS performs on soybeans.

Agronomists and growers no longer see soybeans as just a rotational crop; soybeans are now a primary revenue source requiring more sophisticated management and agronomic strategies to achieve new heights. And AMS is playing a big part in that effort.

In the second year of our Supplement Your Soybeans field trial program, participants learned a lot about how, when and where AMS performs best as part of progressive soybean management.

We're excited to share what we have learned in the 2022 Supplement Your Soybeans field trials. Soybean growers are creating new value with this time-tested and trusted fertilizer. Thank you to our retailer and grower partners and everyone involved in the program. We look forward to learning even more in the future as we help advance and evolve soybean management.



MIKE HAMILTON

Vice President and Business Director,
Plant Nutrients, AdvanSix

AMS and evolving crop nutrient needs converge in Supplement Your Soybeans trials

Ammonium sulfate (AMS) is an excellent source of readily available sulfate sulfur and ammonium nitrogen. As the soybean production landscape changes and farmers work to push plant health and yield thresholds, its performance is worth a fresh look from progressive growers as they explore ways to raise the bar for soybean production.

That new look is what the Supplement Your Soybeans program trials provide for AMS. Retailers and growers from the western Corn Belt to the mid-South once again tested the agronomic viability of AMS in soybeans in 2022.



WHY AMS IS THE RIGHT NUTRITION SOURCE FOR SOYBEANS

As soybean yields rise, so too do the crop's season-long nutrition needs. With increased yields, there becomes a natural gap between total nitrogen uptake and the amount a plant can naturally fix. That gap can be bridged with AMS, providing adequate, consistent nutrient availability to maximize crop performance.

Limited atmospheric sulfur availability due to reduced emissions is increasing the need for supplemental sulfur, a key nutrient for soybeans for stand and canopy establishment before soil organic matter can provide nutrients to soybean plants and they begin to fix their own nitrogen. Sulfur is also critical to late-season development, including when the plant fills pods and maximizes bean size.

The Supplement Your Soybeans program demonstrates just how well AMS can provide sulfur and nitrogen in advanced crop management systems when soybeans face a range of environmental stressors. The field trial program — this year testing AMS in Iowa, Minnesota, Missouri, Michigan and Kentucky — shows how AMS performs in advancing nutrient management in soybeans in a range of growing conditions, management approaches and yield potential scenarios.

SPECIFIC ADVANTAGES OF AMS IN SOYBEANS

While environmental conditions can hinder the uptake of elemental sulfur-based formulations, AMS offers both nitrogen and sulfur in plant-available forms with flexible application options. Research also shows AMS can help unlock phosphorous and micronutrients like zinc, boron, and manganese, increasing the solubility of these nutrients and improving their availability to the plant. Ultimately, you have a well-fed crop at all key growth stages.

Through Supplement Your Soybeans and participating retailers and growers' experience in applying AMS in trial soybean fields, we're sharpening the learning curve and uncovering key advantages, including:



APPLICATION FLEXIBILITY.

Given its immediate availability to soybean plants and flexibility in application equipment and timing, AMS offers growers and their ag retailers agronomic and equipment flexibility compared to other sulfur sources.

CROP AVAILABILITY.

When application rates are matched to specific soil types, soybean plants have quick access to the nitrogen and sulfur nutrition they need for health and growth. Agronomists are very familiar with the rate and timing flexibility of AMS from decades of use in many other crops.

EASE OF HANDLING AND NUTRIENT CONSISTENCY.

Regardless of a soil's nutrient analysis and structure, AMS is a nutrient-dense, easy-to-blend fertilizer that growers can leverage to balance soybean fields for elevated plant health and yield potential.

THE ROLE OF AMS IN FUTURE SOYBEAN PRODUCTION

Progressive growers continue to push yield barriers and adapt soybean management systems to meet these goals. As that trend continues, AMS will become known as a reliable, supplemental nutrient source for soybeans like it has for other crops over the past century.

Today's growers are planting earlier to manage tighter field operation time windows. Ensuring crops have the nutrition they need to thrive from day-one is now a matter of access to the right crop nutrients and products to fit into evolving soybean management strategies to meet ever-growing expectations for the crop.

As soybean farmers continue to advance crop performance through intensive management and season-long attention to crop health and nutrition, agronomists and growers looking to break yield thresholds will continue to learn how to leverage ammonium sulfate, one of the most flexible and cost-effective nutrient tools available.

The challenges AMS helped growers overcome in 2022

Wet, cool springs. Triple-digit summer temperatures. Mid-season dry spells. The 2022 growing season featured a little of everything for the participants in the AdvanSix Supplement Your Soybeans program. The myriad conditions weren't exactly conducive to consistent soybean yields, but they provided a wide-ranging view of how AMS performed.



RAIN DELAYS AND EARLY HURDLES

Though improving crop yield is the ultimate goal in testing any input like AMS, growers and their advisors in the 2022 trials discovered a range of other crop benefits, particularly in bolstering plant health at key times when adverse environmental conditions might otherwise hamper growth and, ultimately, yield potential. Consistency in nutrient availability enabled growers to overcome challenges like a late start to planting, something several trial participants experienced in 2022.

Ohio County, Kentucky grower Patrick Riley was one of them; he faced major rain delays in getting his crop established, then the faucet shut off.

“Patrick planted his trial field May 10, which is very late for his farm. Then, from planting to June 16, we had a little over three and a half inches of rain,” said AdvanSix Sales Manager Jason Magan, who works closely with Riley’s retailer on his crop nutrient

programs. “After that, we had no rain and triple-digit heat until July 6 when the rain started back up and the crop started really growing.”

Keith Schrader had a similar slow start for his soybean crop in Rice County, Minnesota. In his case, a lengthy dry spell that followed his planting window impeded early integration of his topdressed AMS application. Without moisture, plants are unable to take up nutrients provided by AMS.

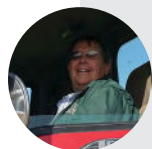
“We normally are planting soybeans around April 20, and our soybeans didn’t get planted until May 24 because it was wet and cool enough to keep us out of the field,” Schrader said. “When we put on the AMS, we didn’t get any rain for at least three weeks. But by August, we did have a few rains and the AMS-treated beans had more internodes than the untreated in later growth stages.”

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KEITH SCHRADER

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AMS GROWS CROP CONSISTENCY

The moisture deficit that Schrader faced in Minnesota has been a consistent theme for the last few years for Ryan Reimers, whose farm sits amidst the rolling hills near Woodbine in western Iowa. The no-till farmer and agronomist faced drought conditions punctuated by a few rain showers early in the 2022 growing season, so his soybean crop's start wasn't ideal. But his trial field showed something out of the ordinary compared to his other fields in recent years, especially those where he's been challenged by crop residue breakdown in his no-till fields because of dry conditions in the last two years.

"Early on, we had a lot of uneven emergence in both our corn and soybean fields. But our AMS-treated soybeans nodulated earlier than those that weren't treated," Reimers said. "Throughout the season, we didn't notice a lot of differences in terms of color or vegetation, or even maturity as harvest got closer. But the trial field was much more consistent. I credit AMS for much of that consistency."



We saw more consistency with the AMS-treated soybeans, and consistency with the crop residue at harvest, too. Less variability like that in general will help you lay the groundwork for future crops.

BRYAN WASHBURN

LATE-SEASON CROP BENEFITS

Later in the growing season, physiological differences like the ones Reimers saw earlier in the year translated to improved yields as harvest neared for Bryan Washburn, who farms with his father, Jon, near Union City, Michigan. After facing similar rain delays early in the year, Washburn saw almost ideal growing conditions later in the season, with "rain just about every weekend." That translated to a major difference in the soybean plants in his trial field compared to his untreated beans.

"We saw more consistency with the AMS-treated soybeans, and consistency with the crop residue at harvest, too. Less variability like that in general will help you lay the groundwork for future crops," Washburn said. "We pulled treated and untreated plants in August and noticed a lot more pods on the AMS-treated plants."

Now what?

SUPPLEMENT YOUR SOYBEANS FARMERS LOOK AHEAD WITH AMS

Looking ahead, those differences will be a big reason Washburn said he's likely to continue applying AMS to his soybeans. He said he's anxious to identify the ideal environmental conditions for crop health and yield response to fine-tune his AMS applications after he's learned more.

"We will keep using it just because I think we're going to have a drier year when we'll see even greater yield benefits than what we saw this year," Washburn said. "I think the yield response will be better if conditions are drier. That's when it will pay off even more."

In planning for the 2023 crop year, Washburn's agronomist Kala Pierucki, with Ceres Solutions in Coldwater, Michigan, said she'll work with him to

integrate AMS into an already progressive crop management strategy. The supplemental fertilizer isn't a cure-all but can make a positive difference when added to such a multi-year strategy.

"It's a whole systems approach; AMS isn't going to get us 10 bu/acre more on its own. But in the case of the Washburns, they're very good about starting clean and staying clean. They keep weeds down and normally don't have to water much. They soil test and manage fertility closely," Pierucki said. "They've always been really good about building the soil and keeping the nutrients there. It's a multi-year progression of keeping the soil in good health, keeping nutrients like nitrogen and sulfur there and keeping fields clean."

Supplement Your Soybeans 2022: Grower insights & results

It was a highly variable growing season for Supplement Your Soybeans program participants in 2022. Most saw yield, consistency and plant health advantages from applying ammonium sulfate (AMS) in their trial fields, including in growing conditions that would normally hamper yield potential.



Patrick Riley

MAXWELL, KENTUCKY

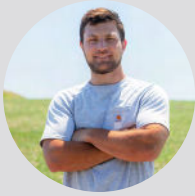


SEE MORE
ABOUT RILEY
AND HIS FARM

PLANTING DATE May 10	2021 AVERAGE YIELD 50 bu/acre
ROW SPACING 15 inches	2022 AMS TRIAL YIELD RESULTS 54.67 bu/acre
AMS APPLICATION RATE/TIMING Pre-plant, 100 lbs./acre	2022 UNTREATED YIELD RESULTS 49.6 bu/acre

AMS YIELD ADVANTAGE OVER UNTREATED FIELDS	5.07 bu/acre
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<p>CHALLENGES</p> <p>After a wet start to the growing season, Riley's crop experienced higher-than-normal temperatures and the driest conditions since the 2012 drought year, which limited the benefits of his AMS application.</p>	<p>KEY TAKEAWAYS</p> <p>While some growers say they normally see improved crop vigor because of AMS applications in higher-yielding environments, Riley observed the same in his lower-quality, hilly ground compared to flatter, higher-productivity parts of his trial field.</p>
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Ryan Reimers

WOODBINE, IOWA



SEE MORE ABOUT REIMERS' FARM

PLANTING DATE May 12–14	2021 AVERAGE YIELD 65 bu/acre
ROW SPACING 15 inches	2022 AMS TRIAL YIELD RESULTS 70.26 bu/acre
AMS APPLICATION RATE/TIMING Pre-plant, 114 lbs./acre	2022 UNTREATED YIELD RESULTS 68.85 bu/acre

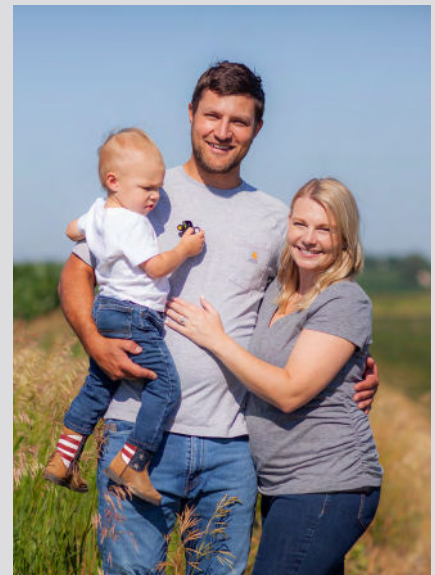
AMS YIELD ADVANTAGE OVER UNTREATED FIELDS	1.41 bu/acre
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CHALLENGES

Reimers' crop faced warmer-than-normal temperatures in July, as well as below-normal rainfall in both July and August.

KEY TAKEAWAYS

Reimers applied AMS to a section of a field where soil conditions started the season “a little rougher” with subpar fertility. His AMS application helped improve crop and soil consistency where he normally observes wider variability in those conditions.





Marc Kaiser
CARROLLTON, MISSOURI



SEE MORE
ABOUT KAISER'S
FARM

PLANTING DATE April 23	2021 AVERAGE YIELD 71 bu/acre
ROW SPACING 15 inches	AMS APPLICATION RATE/TIMING Topdress at V3, 83 lbs./acre

AMS ON IRRIGATED FIELDS 85.73 bu/acre untreated 82.52 bu/acre treated	AMS IN DRYLAND FIELDS 80.26 bu/acre untreated 82.60 bu/acre treated	AMS ON OVERALL TRIAL 83.00 bu/acre untreated 82.56 bu/acre treated
-3.21 bu/acre difference	+2.34 bu/acre difference	-0.44 bu/acre difference

CHALLENGES

After planting delays, dry conditions were the big story for Kaiser's trial field, with lower-than-normal rainfall persisting through June, early July, August and again immediately before harvest.

KEY TAKEAWAYS

A multi-year participant, Kaiser again saw a yield bump on his AMS treated beans, something he attributes to consistent nutrient availability AMS kicked off after his early topdress application. Plants appeared healthier and more consistent throughout the season despite the drought conditions his crop faced.





Keith Schrader

NERSTRAND, MINNESOTA



SEE MORE ABOUT SCHRADER AND HIS FARM

PLANTING DATE May 24	2021 AVERAGE YIELD 68 bu/acre
ROW SPACING 30 inches	2022 AMS TRIAL YIELD RESULTS 44.04 bu/acre
AMS APPLICATION RATE/TIMING Topdress at R2, 110 lbs./acre	2022 UNTREATED YIELD RESULTS 45.40 bu/acre

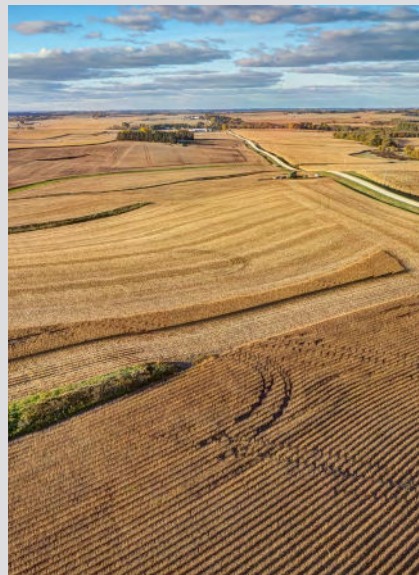
AMS YIELD ADVANTAGE OVER UNTREATED FIELDS	-1.36 bu/acre
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CHALLENGES

Dry conditions were the dominant storyline for Schrader’s 2022 soybean crop. Shortly after planting, his crop was challenged by limited pre-emergence herbicide metabolism because of a lack of rainfall.

KEY TAKEAWAYS

The moisture shortfall that dominated his crop year hampered the crop uptake of Schrader’s AMS application. Though he observed plants in his trial field were taller than his untreated soybeans, initial uptake was limited by dry conditions shortly after application.





Bryan Washburn

UNION CITY, MICHIGAN



SEE MORE ABOUT THE WASHBURNS' FARM

PLANTING DATE May 2	2021 AVERAGE YIELD 65 bu/acre
ROW SPACING 30 inches	2022 AMS TRIAL YIELD RESULTS 76.84 bu/acre
AMS APPLICATION RATE/TIMING Pre-plant, 100 lbs./acre	2022 UNTREATED YIELD RESULTS 75.18 bu/acre

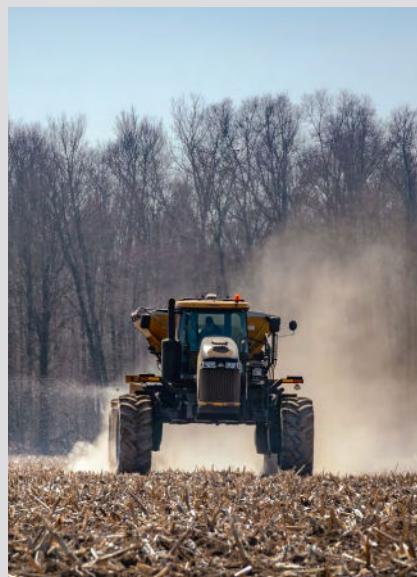
AMS YIELD ADVANTAGE OVER UNTREATED FIELDS	1.66 bu/acre
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CHALLENGES

Washburn's crop faced wet, cool conditions early on, and the moisture roller coaster continued with a dry June before more normal, consistent rains fell in July and August.

KEY TAKEAWAYS

Washburn considers AMS as just one piece of an integrated "systems" approach to soybean management with specific attention to soil conditions that enabled him to apply the right amount of AMS based on soil type and density.



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**Thank
you!**

**LEARN MORE ABOUT THE SUPPLEMENT YOUR SOYBEANS
PROGRAM AT [SUPPLEMENTYOURSOYBEANS.ADVANSIX.COM](https://supplementyoursoybeans.advansix.com)**