

HOW AMMONIUM SULFATE BOOSTS FORAGE PRODUCTION



Growers appreciate the deep-green color of forage crops grown with adequate levels of nitrogen (N) and sulfur (S). However, these nutrients add more than just visual appeal. Critical for chlorophyll, amino acid and protein formation, they are vital for healthy, high-yielding forage stands.

Scientists at Virginia Tech studied the practice of stockpiling forage, leaving time after the last cutting for the stand to grow enough for grazing throughout the winter. Adequate fertilization has proven to be an important part of a successful tall fescue stockpiling program. The form of N was shown to be important as well.

In a three-year study, stockpiled tall fescue showed a linear yield response to the rate of N applied. Yields were highest in the fescue that received ammonium sulfate or ammonium nitrate, with no significant difference between the two. Yields were lowest, and statistically similar where poultry litter, UAN and urea were applied.

Ammonium Advantage

The researchers noted that:

- Urea and UAN were the most likely N sources to suffer losses from volatilization – a significant risk in the warm growing seasons and high-residue conditions.
- UAN also caused some leaf burning.
- Only about half of broiler litters' total N likely became available during the season of application.

The team from Virginia Tech concluded that ammonium sulfate, which like ammonium nitrate is much less likely to volatilize, can be a good alternative to ammonium nitrate, which has been experiencing shrinking supplies for years. This is especially true where sulfur is needed.

Sulfate Advantage

Balanced nutrition translates not just into more forage, but also greater productivity from the animals that eat it.

In a four-year Virginia Tech study, calves in a continuous stocking system showed an 18% increase in average daily weight gain when fed fescue fertilized with ammonium sulfate, compared to calves fed with fescue that had been supplied with ammonium nitrate at similar N rates, but with no S. In fact, over a seven-month feeding period, the total weight gain advantage from the ammonium sulfate-fertilized forage was 65 pounds per calf.

Dr. Dennis Hancock, state Extension specialist for forage crops at the University of Georgia, recommends applying 10 to 15 pounds of S per year to maximize forage yields from sandy and low-organic-matter Coastal Plain soils. This recommendation is consistent with data indicating that healthy grass forage crops harvested for hay remove at least 8 to 12 pounds of S per acre each year.

Ratio is Key

Hancock notes that maintaining the proper ratio between N and S is critical.

“You need to balance nitrogen and sulfur in an appropriate ratio – 10:1 to 11:1 – to ensure that we are feeding the crop,” he says. “Often under irrigation, we’ll push those crops with heavy rates of nitrogen, which may trigger a sulfur deficiency.”

Quick Utilization

Forage crops can be aggressive scavengers of nutrients, including S, as long as the S is in a plant-available form.

“Forage crops can rapidly take up S that is soluble in the soil, and because they are so deeply rooted, applied S [to soil] rarely leaves the rooting zone before it is taken up,” Hancock says. — *Continued*

Quick Utilization (continued)

The key to fast utilization is applying sulfur in the form of sulfate-S, which is immediately available to crops.

In contrast, elemental S must be transformed by soil microbes before its sulfur can be taken up by roots. Thus, ammonium sulfate is a popular S source for many growers, whether applied straight or in blends.

“We use quite a bit of ammonium sulfate in mixture with UAN in south Georgia on those Coastal Plain soils with less organic matter,” Hancock says. “That’s where we’re going to see the most response to sulfur.”

Ammonium sulfate is also valued for delivering N in the ammonium form, which is especially important for summer applications. In hot weather, urea and urea-based fertilizers, such as UAN, are prone to significant losses because of volatilization.

No More Free Sulfur

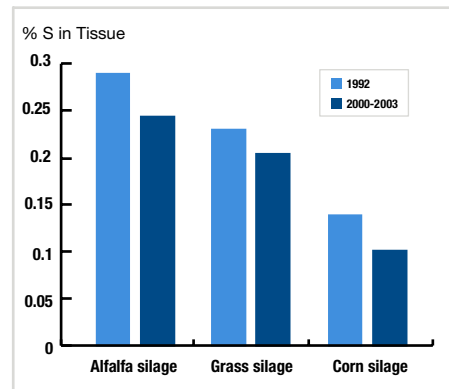
For decades, some producers got “free” S, but those days are mostly gone.

Farmers in the eastern United States, especially the Northeast, used to receive significant amounts of S every year in the form of acid rain, as moisture pulled atmospheric S from the air and deposited it in the soil. Over the past two decades, however, environmental regulations have led to a reduced amount of S in the air, and in turn, dramatic reductions in the levels of atmospheric S transported to fields.

The impact can be seen in plant analysis records from the Miner Institute, which show steadily decreasing levels of S in tissues taken from ensiled alfalfa, grass and corn. This trend continues today.

Sulfur Concentration of Samples Sent to Dairy One Lab

—Miner Institute, 1992-2003



As a result, dairy and beef producers throughout the eastern U.S. (especially the Northeast), have come to appreciate the benefits of ammonium sulfate as a non-volatile source of N that also supplies vital S to boost the yield, quality and palatability of forages.

Useful Resources

Sulf-N® ammonium sulfate is an excellent source of ammonium-N and sulfate-S, which are both immediately available to plants. Sulf-N® is therefore an effective fertilizer for growing healthy, nutritious and palatable forage stands. For more information on Sulf-N® benefits, [visit our website](#), including our [forage grasses page](#), or contact [Mercedes Gearhart](#), Senior Agronomist at AdvanSix.

Contact AdvanSix

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of Ammonium Sulfate, visit

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