

SULPHUR

DO CROPS IN THE SOUTH GET ENOUGH?



As a general rule, the N:S ratio within a crop should not be wider than 15:1. A narrower ratio of applied N and S will be needed to maintain this balance.

To keep N:S ratios in line, farmers should consider applying S anytime they put on N. On irrigated crops, fertigation can be used to make N and S applications.

“We automatically advise sulphur applications for our deep sandy soils.”

**—Dr. Leonard Parks
Clemson University**

For dryland crops, sulphur can be included with most fertilizer applications, but farmers might consider applying one-third of the crop's total S requirement at planting and banding or topdressing the rest after emergence.

To nurse seedlings along in cool, moist soils—especially on early-planted crops or in conservation tillage situations—farmers may also consider adding sulphur to starter fertilizer. This strategy may especially pay off in soils with deep (20-40 inches) sandy or loamy sand surface horizons.

“Early in the spring, when soils are cold and roots just haven't grown or aren't growing fast, it's a good idea to use sulphur in your starter fertilizer.”

**—Dr. Charles Mitchell
Auburn University**



In Louisiana, Coastal Bermudagrass on the left shows benefit of sulphur fertilization.

“Sulphur has boosted our yields of Coastal Bermudagrass by 15-20 percent.”

**—Dr. Marcus Eichhorn
Louisiana State University**

Sulphur—Now More Than Ever

Fifteen years ago, only a handful of farmers in the South deliberately used sulphur in their fertilizer program. And even fewer extension agronomists recommended it.

But today, farmers are obtaining crop responses to applied sulphur (S) from the coast of Delaware to the flatlands of Texas—and at least 12 southern universities now include S in their fertilizer recommendations for a variety of field crops.

“Our research has determined that if high crop yields are to be obtained in the southern states, consideration must be given to ensuring that an adequate supply of sulphur is available to the crop.”

**—Dr. Eugene Kamprath
North Carolina State University**

Where Sulphur is Needed

Sulphur deficiencies are most likely to appear in fields where farmers have made generous applications of high-analysis, sulphur-free materials such as urea, triple superphosphate, conventional N solutions and anhydrous ammonia. The greater use of bulk-blended materials based on urea, DAP and triple superphosphate has also contributed to the increasing incidence of S deficiency.

Course-textured sandy soils with low organic matter are also more prone to S deficiency because this nutrient, like nitrogen, is easily leached from the topsoil by rain and irrigation. High-yield corn, forages and small grains with shallow root systems are especially vulnerable. Cotton, vegetable crops and coastal bermudagrass have also shown a sulphur response.

- Young, upper leaves tend to turn light green to yellowish in color, while N deficiency generally shows up on lower, older leaves.

“With fertilizer, we’re generally glad to get a \$3 return on every dollar we put in. But in many cases with sulphur, it’s not uncommon to get—and this is a conservative estimate—a \$9-\$10 return, particularly on wheat or irrigated corn.”

**—Dr. Bill Segars
University of Georgia**

The most reliable means of testing is an early-season plant analysis (tissue test). Its drawback is that the crop may have already lost some yield potential by the time the nutrient deficiency is discovered. For this reason, many universities now recommend maintenance applications of 10-20



Corn on the left shows typical signs of sulphur deficiency: small and spindly plants with light green to yellowish upper leaves. Compare with healthy, sulphur-fertilized corn on right. Photo: Dr. Joseph Zublena, North Carolina State University.

The increasing need for sulphur comes as no surprise. The absence of sulphur in modern high-analysis N-P-K fertilizers—coupled with more intensive land use and the push toward maximum yields—has caused S shortages to appear where they have not before. Air pollution-control regulations have also limited the amount of free sulphur crops receive from the atmosphere. As a result, deliberate applications of S have increased nearly four-fold since the early '70s.

“My assumption is that everybody is going to fertilize their wheat with nitrogen. So of the three other major nutrients—phosphorus, potassium and sulphur—sulphur is probably the most important. I certainly wouldn't cut it out of my program if I knew it were lacking in the soil.”

**—Dr. Stan Chapman
University of Arkansas**

“Not only can sulphur provide a yield increase, but we've seen a dramatic vegetative response by adding sulphur early on.”

**—Dr. Allen Bandel
University of Maryland**

How Much to Apply—and When

Sulphur-containing fertilizers are available in dry and fluid forms, so it's easy for farmers to include the nutrient with virtually any other fertilizer application—including fertigation. The hard part is determining how much to apply and when.

Soil tests can provide a general indication of the nutrient's availability. Farmers can also check crops for visual symptoms:

- Small spindly plants with short slender stems;
- Delayed maturity;

pounds S per acre in fields where deficiencies are likely to occur. Farm test plots also can provide a good indication of the nutrient's need and economic return.

Watch Your N:S Ratio

Applying high rates of nitrogen over the years has also caused more cases of sulphur deficiency. Because N and S work together to build protein, an ample and balanced supply of both nutrients is needed for plants to get the full benefit of each element. Therefore, applications of nitrogen without adequate sulphur can be costly—not only in dollars, but also in terms of fertilizer efficiency.

“We're seeing that forages need just about as much sulphur in the plant tissue as they do phosphorus.”

**—Dr. Neal Pratt
Texas A&M University**

Talk to a Specialist

Sulphur fertilizer recommendations vary from crop to crop, region to region. For best results, talk to your fertilizer dealer, crop consultant or extension specialist about the best way to include sulphur in your fertilizer program.

Additional information about sulphur in agriculture can be obtained by contacting:



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