

Sulfur

Secondary Nutrient
Primary Importance



Sulfur is a secondary macronutrient. It is critical to the growth of plants as a component of photosynthesis and respiration. Sulfur deficiencies are becoming increasingly common due to higher yields, less sulfur impurities in fertilizer and reduced sulfur emissions in the atmosphere.

Sulfur in the Soil

- More than 95% of sulfur in the soil is organically bound.
- Organically bound sulfur is much more available than inorganic sulfur. For every 1% of organic matter 2 to 3 lbs of sulfur can be released per acre annually.
- Sulfur is most likely to be lost by grain/residue removal and leaching.

Sulfur in the Plant

- Sulfur is plant available as Sulfate-Sulfur.
- Sulfur is a component of cysteine and methionine, essential amino acids to support plant growth.
- Photosynthesis and respiration both require sulfur-based enzymes.

Sulfur Deficiency



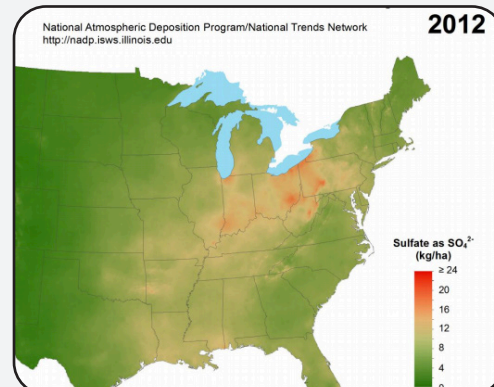
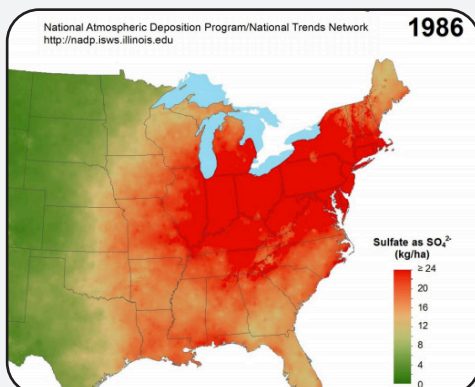
Iowa State University

Sulfur Deficiency

- Sulfur deficiencies are becoming more common and may potentially continue to show up in more fields in the future.
- Deficiency will look similar to nitrogen deficiencies, due to the inhibition of chlorophyll and protein production. Sulfur is not plant mobile, symptoms will be more visible in new growth.
- Plant symptoms include: yellowing of new leaves, occasionally with interveinal striping, as well as stunted plants.

Atmospheric Sulfur

- The amount of sulfur deposited atmospherically has been steadily decreasing, contributing to the increase in sulfur deficiency incidents across the Midwest. This trend is expected to continue, and sulfur applications will continue to become more important.



In-Season Sulfur Sources

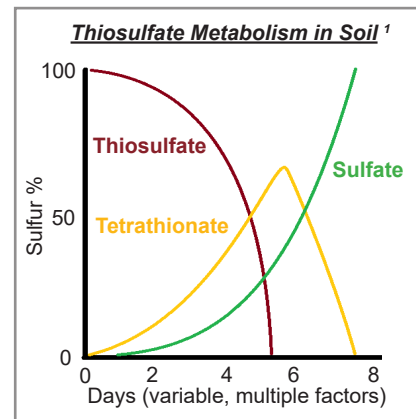


Elemental Sulfur

- A high sulfur analysis provides an economical option to build sulfur fertility levels.
- Unfortunately elemental sulfur requires extended periods for breakdown into the plant available sulfate form.
- Due to lack of availability, elemental sulfur's benefits can be limited when applied in-season.

Ammonium Thiosulfate (ATS)

- ATS (12-0-0-26S) is a commonly used in-season side-dress sulfur source
- Though an economical option, ATS does have limitations for in-season efficiencies.
- The breakdown of ATS to tetrathionate and then to sulfite must occur prior to forming sulfate, which is the plant available form.
- This process can take anywhere from one to over four weeks depending on environmental conditions, microbial population, applied fertilizer rate, and other soil characteristics.
- In each of these byproduct stages, applied sulfur is mobile in the soil. Meaning, for one to four weeks the applied sulfur is unavailable to the crop as well as subject to leaching.



- Analysis: 8-0-0-10S, Taurus Sulfur provides sulfate in a 100% readily available form.
- Can be taken in through foliage in foliar applications or through roots in a Y-Drop application.
- Side-dress application timings are designed for immediate S uptake and crop utilization.
- Taurus Sulfur is fueled by Yield Burst technology, providing enhanced nutrient uptake, efficiency and plant health benefits.
- A more efficient sulfur source, allowing a lower use-rate with improved crop performance.
- High efficiency, low use-rate, means easier storage and application convenience

ATS Replacement Recommendation

| ATS | = | TAURUS SULFUR |
|-----------|---|---------------|
| 2 gallons | = | 1 quart |
| 3 gallons | = | 1.5 quarts |
| 4 gallons | = | 2 quarts |
| 5 gallons | = | 2.5 quarts |

Nitrogen and Sulfur Side-Dress Applications

