Ensuring that plants have enough of the nutrients they need to grow is essential for commercial farming. While many people are familiar with the need for nitrogen and phosphorus for crop growth, and the potential for overapplication of these nutrients, there is less chatter about sulfur.

Producers have observed sulfur deficiencies in corn, soy, and wheat crops. The primary symptom of sulfur deficiencies is yellowing of foliage, which is similar to N deficiencies and could be misidentified. These sulfur deficiencies are thought to be linked to a decrease in atmospheric SO$_2$ concentration, which has declined since the 1980s. The Clean Air Act has reduced sulfur pollution, mainly from power plants, by 81% between 1989 to 2013. Another reduction in sulfur input into farm fields is due to the improved processes to make fertilizers and pesticides, which have decreased the sulfur impurities in these products that are commonly applied to farm fields. While the decrease in air pollution and improved products have positive benefits for the environment and society, the naturally occurring sulfur from mineralization of organic matter may not be adequate for crop growth, depending upon the soils.

One solution is to apply sulfur fertilizer, but as with any fertilizer, overapplication is problematic. A recent article in the Soil Science Society of America Journal (https://doi.org/10.2136/sssaj2018.10.0368) focuses on the need for sulfur fertilizer application in irrigated corn grown on sandy soils in Minnesota. Plots were treated with 0, 14, 28, and 42 kg S ha$^{-1}$ using a combined NPKS fertilizer at planting. Plots were then split into those with or without an in-season sulfur fertilizer application where the same four rates were applied in season at the V5 growth stage. This application design resulted in a four-by-four factorial design with total sulfur application rates ranging from 0 to 84 kg S ha$^{-1}$. The researchers sampled soils and plant tissue throughout the growing season, whole plants at the end of the experiment, and compared yield across treatments.

Many producers assume that sulfur application will increase grain yield, as sulfur is essential for corn growth. And, in this study, plant tissue sampled early in the growing season showed a positive response to sulfur fertilizer. However, in plots where greater amounts of fertilizer were applied or where applications were made more than once throughout the growing season, corn yield did not significantly increase. Plants will take up more sulfur if available, but a single 28 kg S ha$^{-1}$ application appears sufficient.

Ensuring that growers are not overapplying fertilizer can reduce input costs as well as the potential for runoff. Sampling soils and testing plant tissue to determine if the sulfur application is even needed is a first step toward developing a management plan for sulfur fertilizer applications.

Dig Deeper

View the full Soil Science Society of America Journal article, “Does Irrigated Corn Require Multiple Sulfur Applications?” at: https://doi.org/10.2136/sssaj2018.10.0368.