



Sulphur in Row Crops

by Carley Matheson, CCA-ON

The requirements of sulphur in agricultural crops seems to be a hot topic again this spring, with presentations at South West Agriculture Conference and airtime on Wheat Pete's Word podcast to name a few. Although there is a lot of information surrounding this topic, there are still many unanswered questions as we head into the 2018 planting season. That being said, here is what we have learned so far.

Over the past several decades, our society has been able to clean up emissions from industrial processes, which have reduced the incidence of acid rain. While the decreased occurrence of acid rain has been great for the environment, it has set up a scenario in our soil where the natural levels of sulphur are depleting and not being restored naturally through acid rain.

The US Corn Belt has started to see visible signs of sulphur deficiency in their crops for the first time ever. Because of this corn, wheat, and alfalfa ground have been receiving sulphur applications pre-planting, and sometimes a rescue is needed in crop if deficiency symptoms appear severe enough during a growing season.

Sulphur in the soil is present in two forms, sulphide and sulphate.

The sulphate form of sulphur is the most available for the crop to utilize and uptake, while the sulphide form is not available for crop uptake and needs to be covered into the sulphate form by soil microorganisms. Sulphur is not mobile in the plant, so a continuous supply is needed during the entire duration of the growing season in order to fulfill its needs. Deficiencies at any time during the crop's vegetative growth stage will restrict plant growth height and have an impact on the overall yield of a crop. Typically spring applications of sulphur in Ontario will allow the best, most available, use of sulphur in the soil for a crop.

So how do you know what the sulphur levels are in your soil?

Unfortunately there is no reliable soil test to accurately measure levels in the soil, so, being able to identify deficiencies in crop is very important to help a farmer determine if sulphur is needed. In alfalfa, tissue testing mid-bud to early flower is considered to be a suitable diagnostic tool in determining deficiencies. Due to immobility in the plant, deficiency symptoms will appear first in the new leaves, which tend to have a lighter

green/yellow appearance, while older leaf tissue can appear to look healthy. One way to determine if sulphur is required is utilization of in-crop nitrogen rich strips. Over supplying of nitrogen to sulphur deficient fields will further immobilize the remaining sulphur in the soil, causing the crop to remain deficient and appear yellow.

The majority of farmers who are applying sulphur have been traditionally applying around ten pounds of actual sulphur per acre on corn and wheat, while alfalfa can be receiving anywhere from zero to twenty pounds of sulphur. However, without an accurate soil test to measure sulphur levels, is there really a way to know if that is enough? Research articles on this topic suggest that between ten and twenty pounds of actual sulphur provides adequate nutrition for plant health and does not limit overall yield in small grain and corn crops. Studies surrounding the response of alfalfa to sulphur applications have had mixed yield results, but we do know that four ton/ac crop of alfalfa will remove approximately 20lbs/ac of sulphur which translates to a five lb/ac per ton of dry matter removal of sulphur. With that type of removal rate, it may be worth applying sulphur to existing alfalfa stands, being sure to leave a test strip to determine if the crop responded to the sulphur treatment.

Caution is needed when it comes to the type of sulphur fertilizer that you are using to achieve your goals, as not all of the fertilizers are made using the sulphate form. Elemental sulphur can be used in fall applications to build soil levels, but there is not a good way to determine how much of that elemental sulphur is available the following spring. Multiple fertilizers are available that are created using, in part, the sulphate form of sulphur, which will be available for the crop during the growing season which include: MESZ containing 10% sulphur (5% elemental, 5% sulphate), Ammonium thiosulphate (ATS) containing 26% sulphur, Potassium Thiosulphate (KTS) containing 17% Sulphur, Ammonium sulphate (AMS) containing 24% sulphur, Sul-Po-Mag/K-Mag contains 20% sulphur, and Potassium Sulphate containing 18% sulphur.

Regardless of the type of sulphur fertilizer you choose to use, I believe we can say with some certainty that with our changing environments, we need to be supplementing our crops with some type sulphur in order for the plants to reach their maximum potential.

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