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THE AGRONOMY CORNER

SULFUR

The last of the minor nutrients to be discussed is sulfur.

Sulfur is a part of every living cell and without it, life would not exist. It is required for synthesis of certain proteins as well as being part of photosynthesis, chlorophyll and winter hardiness of plants. It is also involved with seed production and nodule formation on legumes.

Sulfur is supplied to plants through the breakdown of mineral sulfur and the conversion of organic matter to the sulfate ion by soil bacteria. The demand for sulfur by rapidly growing crops can overwhelm the slow process of breakdown or conversion of the organic matter. For this reason, sulfur needs to be supplied to the soil well before it is needed.

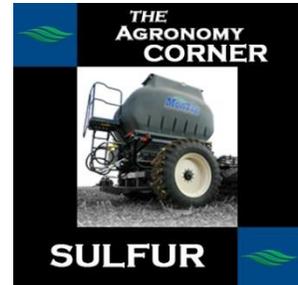
Most of the sulfur measured through a soil test is the elemental sulfur as a mineral or locked up in organic matter. Also, because sulfur is very mobile in the soil, soil test levels will probably not show the plant available level of sulfur. Thus the only good method of determining sulfur levels is through plant tissue tests.

Once it is converted to sulfate, sulfur becomes very mobile in the soil and can be leached below the root zone by heavy rain or irrigation. It can then still rise with evaporation. This is the reason that some soils will show deficiency signs of lack of sulfur early but grow out of them later.

Sulfur deficiency shows up as a yellowing of plant tissue. Since nitrogen deficiency has the same symptoms, it can be difficult to tell which nutrient is short. Because sulfur is immobile within plant tissue, it will not readily migrate from older tissue to new growth. New growth must obtain sulfur from the sulfate ion from the roots. Thus look for deficiency signs on new growth. However, sulfur can be deficient and the plant will show no signs until a reduced harvest.

A potential problem with sulfur deficiency is that nitrate nitrogen can accumulate since it is not being converted into proteins. This can pose significant health risks for grazing animals or animals eating such hay or stover. Sulfur deficiency can also cause a reduction in seed formation for certain legume crops.

Crops that produce large amounts of dry matter like corn and hay require large amounts of sulfur. Certain vegetables also have high sulfur demand. Balancing sulfur and nitrogen is thus



very important to make certain that sulfur deficiency is not caused by high demand along with high application of nitrogen.

Sulfur is likely to be deficient in most crop production fields unless the fertilization program adequately accounts for it. The reason is twofold. First, we are producing more and more plant tissue with high yielding hybrids that require more sulfur and second, there is far less sulfur being applied. Agriculture chemicals now contain far less sulfur than they used to and far lower levels of sulfur gases are in the air to be absorbed by rain water.

Sulfur fertilization needs to be done while paying close attention to the pH of the soil since the different sources of sulfur affect the pH in different ways. Elemental sulfur along with ammonium sulfate and thiosulfate lower the pH. K-Mag, Gypsum and magnesium sulfate do not.

Take aways.

Sulfur is vital to all life and without it, life would not exist.

Most of the sulfur in the soil is held in mineral form or organic matter and must be converted into the sulfate ion before a plant can use it.

Because of sulfur's slow breakdown from the mineral or organic matter form, fast growing crops can exceed the readily available sulfur. Apply needed sulfur well ahead of planting the crops.

Soil tests for sulfur do not give a reliable picture of the availability of sulfur because most of the sulfur is tied up as elemental sulfur or organic matter. The available sulfur, as the sulfate ion, is very mobile in the soil and can be below the soil test probe. Only tissue analysis will tell you about the true availability of sulfur.

Sulfur deficiencies can be masked by nitrogen deficiencies since they both exhibit the same symptoms. Accumulated tissue sulfur is not readily relocated to new tissue so look at new growth for possible sulfur deficiency.

Over fertilization of nitrogen can cause a deficiency in sulfur. Proper balance, especially for crops with high dry matter is critical.

A sulfur deficiency can cause excessive nitrate nitrogen in plants and be a health hazard to livestock.

Sulfur is likely to be deficient in modern crop production fields.

The source of fertilizer sulfur can affect the pH of your soil.

Links to the sources for this discussion:

<http://www.cropnutrition.com/efu-secondary-nutrients>

<http://eldoradochemical.com/fertiliz1.htm>