

Post Rock Extension District Column

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By Sandra L. Wick

K-State Research and Extension-Post Rock District
Crop Production Agent

Sulfur deficiency in your wheat could be showing up sooner than you think!

WOW.....what a crazy 2020!!!! We hope that you all are staying safe and well! It soon will be time to think about your wheat fertilizer topdressing application and you might think about adding sulfur to the tank.

In recent years, **sulfur (S) deficiency** in wheat has become common in many areas of Kansas, particularly in no-till wheat. The likely reasons for this is a reduction in sulfur additions to the crop from atmospheric deposition (there is less S in the air now) and cooler soil temperatures as a result of no-till which slows S mineralization in the soil according to Dr. Dorivar Ruiz Diaz, K-State Research and Extension Soil Fertility specialist. Some crops in the rotation, such as soybean, can also take up significant amounts of S resulting in a S deficiency for the following wheat crop.

Historically, S deficiency was most common on high-yielding crops grown on irrigated, sandy soils low in organic matter and subject to leaching. Ruiz Diaz points out that due to reasons discussed above, an increasing number of finer-textured soils have shown S deficiency in recent years.

Generally, S-deficient wheat is yellow and stunted and is observed in patches in the field, especially in areas where there has been previous soil erosion or soil movement. The patchy S-deficient areas of the field are often found on hilltops or side slopes where erosion has occurred and soil organic matter is reduced, or where leaching is more pronounced. Wheat in areas where topsoil was removed or significant cuts were made (i.e. terraced or leveled fields) also commonly shows symptoms.

Sulfur deficiency in growing crops is often mistaken for nitrogen (N) deficiency. However, unlike **N deficiency where older leaves** show firing and yellowing, with **S deficiency, the pale yellow symptoms often appear first on the younger or uppermost leaves.** Wheat plants with S deficiency eventually become uniformly chlorotic with yellow leaf tissue.

Sulfur deficiencies in wheat have been showing up early in the spring, shortly after green-up, before organic S is mineralized from soil organic matter, and before wheat roots can grow into the subsoil to utilize any available S (sulfate) accumulations. Deficiencies of S are often difficult to identify because the chlorosis is not always obvious. Crops lacking S also may be stunted, thin-stemmed, and spindly. In the case of wheat and other cereal grains, maturity is delayed. Winter annual weed competition is also enhanced due to the slower growth and lack of good tillering.

At present, many fields in north central and northeast Kansas have an established history of S deficiency for wheat. **In this situation, rather than waiting for symptoms to appear in the spring, farmers may want to consider a winter topdress application of S as a preventive measure.**

A soil test for available sulfate-S in the soil profile is available. For proper interpretation of this test, soil organic matter, soil texture, the crop to be grown, and the expected yield level all need to be considered. Accurate estimates of S needs cannot be made from a surface sample alone. Ruiz Diaz stresses that since sulfate is mobile so sampling to a 24-inch depth is important! However, due to the relatively high demand for S during the rapid vegetative growth phase of wheat, and relatively shallow rooting by the wheat crop at this time, the S measured in the deeper, subsoil levels by the test may not be available to wheat in the early spring, especially where soils are cold.

There are many S-containing fertilizer materials. Several **dry** materials are available that can be blended with dry phosphorus or nitrogen fertilizers for winter/spring topdressing. However, some of these products are best used in pre-plant applications. Below are some S sources provided by Ruiz Diaz.

- **Elemental S (typically 90-95 percent S)** is a dry material marketed by several manufacturers. Elemental S is not well suited for corrective applications to S-deficient wheat in the spring, due to the time required for oxidation to sulfate.
- **Ammonium sulfate, AMS (21-0-0-24S)** is a dry material that is a good source of both N and S. However, it has high acid-forming potential and soil pH should be monitored. Ammonium sulfate is a good source to consider for either pre-plant or topdressing to correct existing sulfur deficiencies.
- **Gypsum (analysis varies)** is calcium sulfate and is commonly available in a hydrated form containing 18.6 percent S. This material is commonly available in a granulated form that can be blended with other materials. Since it is a sulfate source, it would be immediately available and is another good source for spring topdressing. However, gypsum is not as water soluble as many fertilizer materials such as ammonium sulfate.
- **New N-P-S products such as Microessentials, 40-rock and others** that are typically ammonium phosphate materials formulated with S, and in some cases micronutrients such as zinc. In most of these products the S is present as a combination of elemental S and sulfate.

Liquid S-containing fertilizers:

- **Ammonium thiosulfate, ATS, (12-0-0-26S)** is the most popular S-containing product used in the fluid fertilizer industry as it is compatible with N solutions and other complete liquid products.
- **Potassium thiosulfate, KTS, (0-0-25-17S)** is a clear liquid product that can be mixed with other liquid fertilizers.

Topdressing with thiosulfate and UAN can be done early, before Feekes 5 growth stage (green up), and at temperatures below 70 degrees F. Be aware that some leaf burn may be expected with some of these liquid fertilizers. These products would be good sources for pre-plant application as well. For more information, see *Sulfur in Kansas*, K-State publication:

MF-2264, <http://www.ksre.ksu.edu/bookstore/pubs/MF2264.pdf>

For more information on “wheat fertilization”, stop by or call me at any office of the Post Rock Extension District in Beloit, Lincoln, Mankato, Osborne or Smith Center.

Post Rock Extension District of K-State Research and Extension serves Jewell, Lincoln, Mitchell, Osborne, and Smith counties. Sandra may be contacted at swick@ksu.edu or by calling Smith Center, 282-6823, Beloit 738-3597, Lincoln 524-4432, Mankato, 378-3174, or Osborne 346-2521. Join us on Facebook at “Post Rock Extension”. Also remember our website is www.postrock.ksu.edu and my twitter account is @PRDcrops.