

Corn Crop Appears Sulfur-Deficient In Western Illinois

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Though sulfur is an essential nutrient for crop production, it has received little past emphasis because deficiency was seldom observed. An intensive study in the late 1970s showed that sulfur deficiency was not a major concern for Illinois, but

in more recent years, the frequency of sulfur deficiency in corn has increased, though it is not widespread.

Several factors may be contributing to an increase in sulfur deficiency: less atmospheric sulfur deposition, the result of strict air pollution standards; less incidental sulfur in fertilizers, insecticides, and fungicides; fewer livestock operations, causing less application of manure; increased use of conservation tillage, which may reduce early-season mineralization of the organic sulfur in the soil; and greater rates of removal from soil, resulting from increasing grain yields.

Sulfur deficiency causes yellowing of foliage and is sometimes confused with nitrogen deficiency. However, unlike nitrogen, sulfur does not readily move inside the plant, so deficiency tends to be more visible in newer leaves, whereas nitrogen deficiency shows up in older leaves. A typical symptom of sulfur deficiency is the development of a pattern of dark and light streaks, termed interveinal chlorosis, in the newer leaves.

Deficiency symptoms often show up in soils with low organic matter (including sandy soils), in soils with low pH, and when cold and wet conditions reduce the mineralization process needed to make sulfur in organic matter available to the crop. Since sulfate is leachable, often corn shows a deficiency early in development that disappears once the root system taps into the sulfur that has accumulated in the subsurface soil.

Over the last few years I have been conducting a study to evaluate corn response to sulfur applications. Last year I described some of the results obtained to that point.

Some reports I received this week from western Illinois suggest that sulfur deficiency may be showing up in different fields across a large geographic area that includes bottomlands as well as fields in bluffs and other landscape positions with various soil properties. The photo here was taken in one of these fields. I suspect a main reason for this deficiency symptom is relatively low sulfur concentrations in the soil exacerbated by dry conditions that do not allow the crop to extract sufficient sulfur from the soil.

As the root system develops and starts tapping more soil volume, and provided there is sufficient rainfall, the deficiency will most likely disappear. Still, if a sulfur application is deemed necessary, I recommend using a fertilizer containing sulfate (SO₄²⁻), which is the plant-available form of sulfur. I would not apply elemental sulfur, as it takes too long for this material to become available for the crop.

I also recommend applying sulfur into the soil. While a foliar application may temporarily relieve the symptoms, ultimately sulfur needs to be taken up through the root system in order to satisfy crop needs. Also, a foliar application of ammonium sulfate can cause leaf burn and would counter any visual improvement resulting from sulfur. Current research indicates that corn response to sulfur is maximized at a rate of 20 to 25 lb of sulfur per acre. Most sulfur fertilizers contain nitrogen, so if a sidedress nitrogen application is planned in a field showing sulfur deficiency, applying a nitrogen source with sulfur could be an effective way to provide both nutrients. I recommend doing the application sooner rather than later.

A test trial is the only way to determine



A corn plant showing interveinal chlorosis in the newer leaves, a typical symptom of sulfur deficiency.

Photo courtesy Andrew Campbell

whether a particular field could be responsive to sulfur. If you are planning to apply sulfur and would like to participate in the ongoing sulfur research project, I am looking for volunteers again this year. The study design is very simple: at least three alternating strips with and without sulfur. If you are interested, please contact me (217-333-4426, fernande@illinois.edu). Not only would your participation provide useful information on your specific field, but the more coverage of the state we obtain, the better we can predict on a broader scale where sulfur applications would most be needed. Δ

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