

## **Sulfur Recommended for Wheat on Sandy Fields**

By Ray Benson, Mississippi County Agent-Staff Chair

Sulfur (sulfate) is a mobile nutrient that readily moves with soil water. Sulfur deficiencies can be observed in wheat grown on sandy fields, especially during wet years. During wet years, sulfur can leach below the root zone and become unavailable to the crop. In addition, coarse textured soils are inherently low in organic matter and have lower levels of native sulfur.

Wheat grown on clay soils, and many silt loams, generally will not experience sulfur deficiency. These soils are less prone to leaching and have more organic matter which breaks down to release sulfur and other nutrients. Wheat yield response to sulfur fertilizer is not normally observed in research trials on these soil types.

Sulfur deficient wheat will generally be stunted, poorly tillered, and appear pale green. The main symptom of sulfur deficiency is chlorosis (yellowing) of the youngest leaves. Since sulfur is immobile in the plant, deficiency symptoms will appear on new plant growth before it is visible on older plant parts.

From the turn row it is easy to confuse nitrogen deficiency with sulfur deficiency. Unlike sulfur, nitrogen is able to move in the plant. When nitrogen becomes deficient, the newest leaves will be green while the older leaves will become pale green to yellow as nitrogen is moved from them to the new growth. To add to the confusion, wet conditions promote deficiency of each of these nutrients.

Several tests have been conducted in Arkansas to address sulfur deficiency in wheat. Several studies in Arkansas have been established to test sulfur fertilizer applications in wheat. A 1986 study conducted by Dr. Rich Mahler and Dr. Rich Maples, documented a wheat yield increase when ammonium sulfate (AS) was applied to a Keo silt loam with low soil test sulfur values. In this study, wheat yields were increased by 6 bushels per acre with the application of 10 lbs of sulfur (applied as AS) and by 10 bushels per acre when 20 lbs of sulfur were applied. Higher rates of AS did not produce any additional yield.

In the same study, March applications of AS to wheat grown on a Dundee silt loam did not increase yields. Similar studies on clay soils have shown no response to sulfur applications.

Several Mississippi County tests have also been conducted to evaluate wheat's need for sulfur fertilizer. In 1997, the application of 20 units of sulfur improved wheat yields 9 bushels per acre on a sandy soil on the Lowry Robinson farm near Athelstan. In this study, test weights increased by 2 pounds per bushel on plots which received sulfur. Results from a similar test conducted on a silt loam soil of the Mike McCarty farm near Osceola, showed no response to sulfur applications.

In 1998, sulfur fertilizer tests were conducted on two sandy fields. One field was on the Dwight & Ricky Jackson farm near Milligan Ridge, and the second field on the Gordon Miller farm near Leachville. Below average rain during that winter likely resulted in little or no leaching of sulfur in those fields. In both fields, no yield response to sulfur fertilizer was

observed. These data indicate that wheat grown on soils highly prone to leaching may respond to spring applications of sulfur fertilizer, especially in wet years.

The Cooperative Extension Service recommends the addition of 20 pounds of sulfate-sulfur with the first spring nitrogen fertilizer application on soils prone to leaching or on fields with a history of sulfur deficiency. Producers typically apply 80 pounds of AS (contains 17 pounds of nitrogen and 19 pounds of sulfate-sulfur) with their first spring nitrogen application on lighter textured fields.

Currently, nitrogen from this rate of AS costs \$7/acre more than equal amounts of nitrogen from urea. Generally, wheat grown on heavy textured (more sandy) fields, may show an economic response to sulfur fertilizer especially if the fields have a large percentage of sand blows. Under these conditions, a 5 bushel yield (\$7.40 wheat) response on 20% (sand blow areas) of a field would recover the \$7 spent to include sulfur in the budget.

If some of your wheat is on light textured soils or you have fields heavily riddled with sand blows, make plans to include 80 pounds of AS in your first spring fertilizer application. For more information on wheat sulfur fertility, contact your University of Arkansas, Division of Agriculture, Mississippi County Cooperative Extension Service.

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