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Do I Need to Fertilize With Sulfur?

by Matt Montgomery, Burrus Sales Agronomist

Growers have a pretty good feel for which nutrients require the addition of fertilizer and which do not, but when it comes to sulfur there is a lot of confusion. The Burrus footprint may be entering a transition period when it comes to sulfur fertilizer. While Burrus is not prepared to say that growers must begin to apply sulfur, we do believe a day is coming when this will be the case. Burrus is taking the first step toward monitoring the situation this summer thanks to a cooperating fertilizer dealership (GRAINCO FS). Before we talk about our efforts to learn more, let's first talk about where our footprint has been, where some areas have gone, and why the old story may begin to change in relation to sulfur fertilizer.

Sulfur - Where has the Burrus footprint been?

The story on sulfur fertilizer has been pretty consistent over the years. The research behind that story occurred during the late 1970s. Five different researchers participated in an Illinois sulfur fertilizer study (two of the authors were Dr. Bob Hoeft, University of Illinois and Dr. John Sawyer, Iowa State University). Of the 80 different "site years" exposed to sulfur fertilizer, only 5 of those locations showed a response. The study concluded that sulfur fertilizer was not needed in most cases.

A series of studies conducted by Dr. Fabian Fernandez between 2009 and 2011 in Illinois appeared to reiterate those 1970s era conclusions. While the overall state results indicated no response to sulfur fertilizer, Dr. Fernandez did note the presence of specific locations which appeared potentially responsive (specifically sandy, coarse soil locations).

Sulfur - Where have some areas gone?

The story that sulfur fertilizer is not necessary was soil science gospel until recently, when Dr. John Sawyer began to notice significant responses in Iowa. In 2007, the response rate was 17 out of 20 sites. By 2009, all but a few sites in his research were responding to sulfur applications. While the old story about sulfur fertilizer being unnecessary appears to be the case in most of the Burrus footprint, the data from Iowa hints that Midwest crops may eventually require sulfur fertilizer, thus our emphasis on monitoring the situation.

Why might the sulfur story be changing?

The story on sulfur fertilizer remained unchanged for nearly 30 years, and the recent changes to that story have a lot to do with what we have called "the sulfur budget." Briefly stated, the plant's available budget for any nutrient is greatly influenced by how much of that nutrient moves out of the soil and how much of that nutrient moves into the soil.

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Let's start with how sulfur movement out of the soil has changed. Crop removal represents one of the most significant pathways of sulfur loss. Leaching of sulfur represents a second important pathway of soil loss. Each bushel of harvested grain takes some sulfur with it, and frankly we remove a lot more grain than what we did 30 years ago. Consider Figures 1, 2, and 3. All three graphs show awe inspiring increases in corn yield. In other words, we take a lot more sulfur off of the field than we ever have before.

Let us now look at the other half of the sulfur budget. The amount of sulfur moving into the soil has decreased. We have cleaned up the environment. Since the early 1990s, the US EPA has worked with the electrical industry to reduce sulfur emissions. When sulfur emissions were at their highest, sulfur fell with rainwater and unintentionally fertilized fields. A cleaner environment has many benefits associated with it, but it does mean less sulfur being deposited via rain for our crops.

This is how the story has changed. More sulfur is going out and less sulfur is coming in. One can now understand why some soil scientists believe we will eventually encounter situations where sulfur demand presses past sulfur supply.

Burrus is exploring the topic

Burrus is experimenting with a series of plots within our footprint to determine if there is a response to sulfur applications. We are looking to see if some areas within our footprint might begin to show the first evidence of a change to the sulfur story.

Individual plots are roughly 6 rows by 80 feet. A sulfur treated plot is planted to a specific hybrid and positioned near a plot of the same hybrid without the sulfur treatment. The application rate is 20 pounds of sulfur per acre. Each sulfur-hybrid treatment is replicated at least 3 times per location (i.e., 3 sulfur treated plots and 3 untreated plots per location).

Burrus hypothesizes that the sulfur story has not changed in much of our footprint. We base this hypothesis on emissions data, and believe that much of the Burrus footprint will not display statistical responses to sulfur. However, we can only be sure if we test that idea. Now we get to have a little fun determining if the hypothesis is true, false, or if we sense a change coming to the sulfur story. Hopefully, our work will begin to bring a little more clarity for growers.

Comments or questions for our Agronomic Research Team?
Submit to us at: burrus.seed@burrusseed.com

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Figure 1

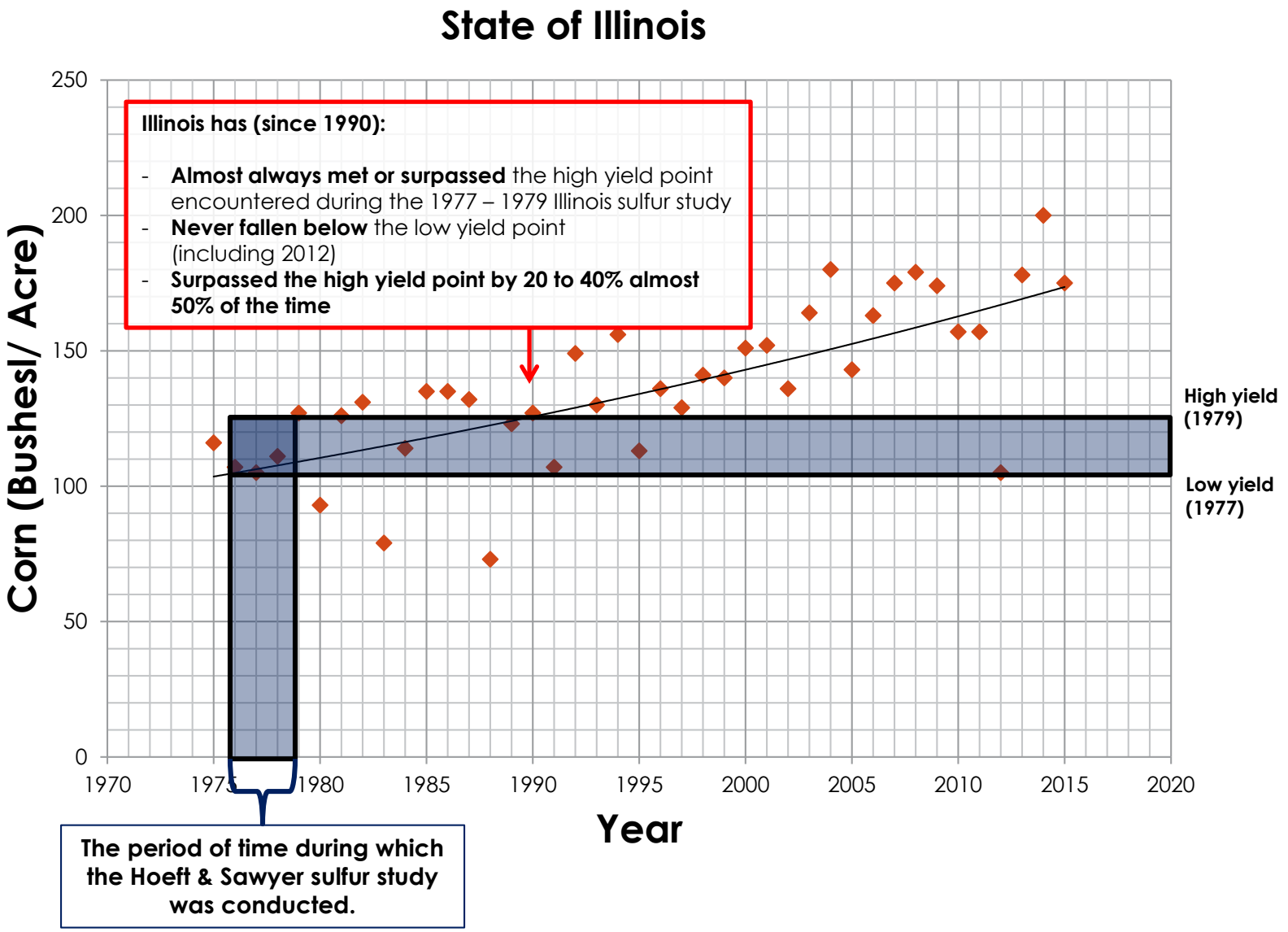

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Figure 2

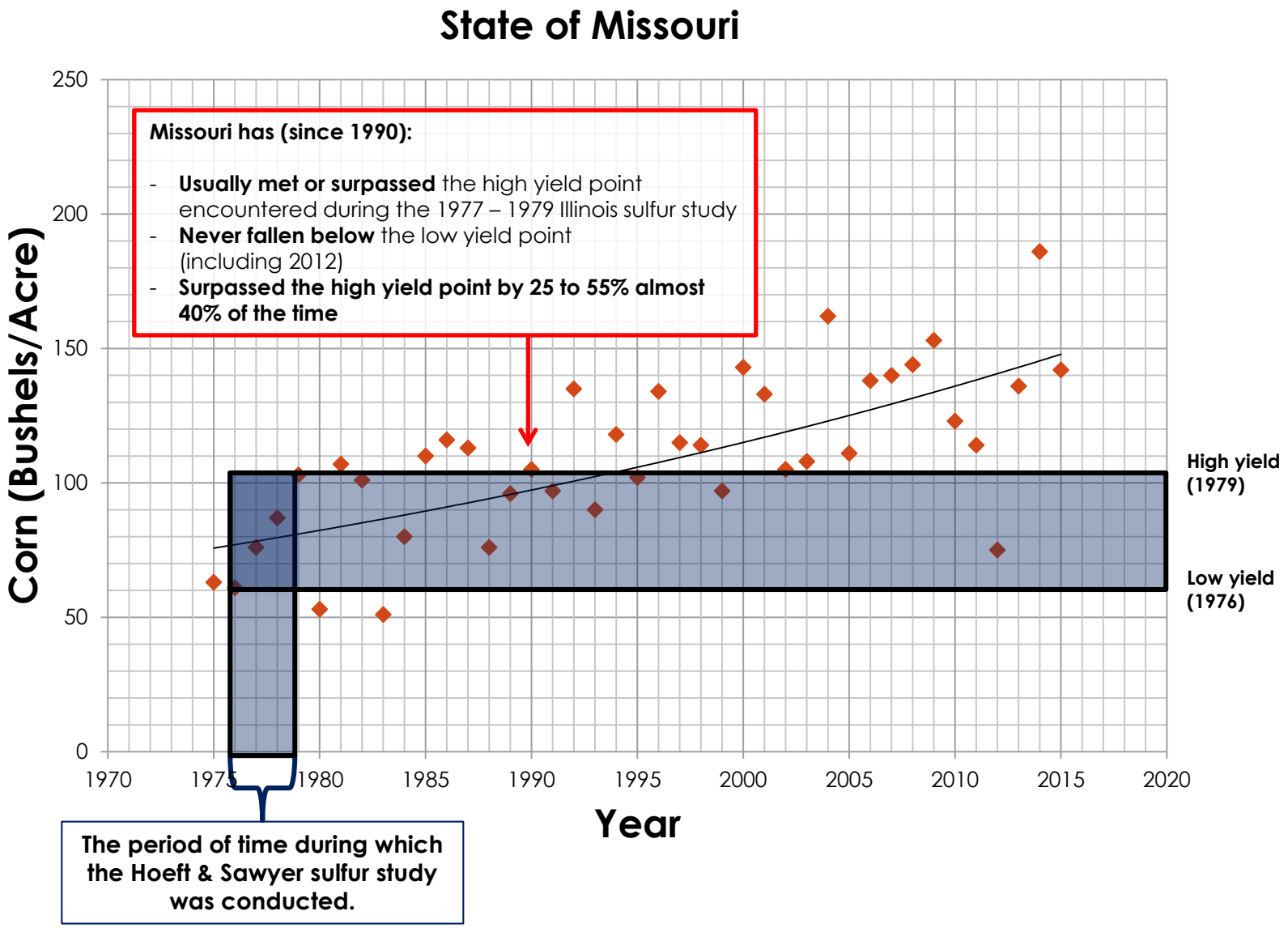

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Figure 3