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Soybean Fertility Considerations

Soybeans are a great fit for our eastern Kansas crop rotations for a number of reasons. One of those reasons is their ability to fix their own nitrogen, subsequently reducing that crop input cost for the soybean portion of the rotation. It might be tempting with tighter production budgets to consider cutting other crop nutrient inputs for soybeans as well. Do so only with extreme caution!

For example, while soybeans do tend to be able to obtain adequate amounts of phosphorous from the soil at lower soil P levels than say, corn or wheat, low soil test levels may well warrant phosphorous applications to make sure the crop has what it needs to produce adequate yields. As a general rule of thumb, soybeans remove around eight tenths of a pound of phosphorous in each bushel of grain yield. At low soil test levels, or in situations where we provide P to the corn portion of the rotation but not the soybeans, soil test levels could drop to a level where additional phosphorous applications are necessary to provide an adequate yield environment.

Low phosphorous levels have even been found to be a factor in soybean disease! A long term macronutrient fertility study at the Kansas River Valley Experiment Field with a corn/soybean rotation have showed that soil P levels can have a significant influence on the severity of SDS (Sudden Death Syndrome). During the soybean rotation phase of the study, SDS symptoms increased significantly as P fertility decreased. On a site where no P had been applied, the percent defoliation by SDS at R6 averaged 39% compared to 16% in a plot where a 60 pound P rate had been applied. The resulting yield increase was greater than 50%! The bottom line: paying attention to soil P levels is an important step in SDS management!

Response to potassium fertilizers is also high in soybean production, with deficiencies on the increase over the last decade or so. Removal rate of K in soybean production is generally around 1.4 pounds per bushel.

While micronutrients like sulfur and in some instances iron (typically in high pH soils) might be of concern, research hasn't shown consistent responses to other micro nutrients that would limit soybean yields at this time.

Soybeans are an important part of our crop rotation. While their fertility needs are not the same as those we are used to in corn production, they are important just the same. When soil test levels are low, nutrients need to be applied to each crop in the rotation for the best response. Make sure your soil sampling or tissue testing program addresses potential deficiencies to insure your soybean crop is as productive as it can be!