Soil-test-based P and K interpretation influences the accuracy of fertilization decisions

Soil fertility testing is used on millions of acres to predict crop response to fertilization and for placement of different fertilizer rates in precision agriculture. Soil-test-based fertilizer recommendations have been assumed to be accurate or—in the case of many land grant university recommendations—too conservative, implying that the recommended nutrient rates, critical soil-test values, or both are too low to maximize crop yields.

A recent article in the *Soil Science Society of America Journal* describes research assessing the accuracy of fertilizer P and K recommendations to predict the response of irrigated soybean to fertilization.

The research shows existing recommendations accurately predicted soybean yield response to fertilizer P application on 38 to 50% of the sites and to fertilizer K application on 60 to 78% of the sites with the range of accuracy representing conservative ($p < 0.05$) to liberal ($p < 0.25$) statistical interpretations of significance, respectively. The false positive error was the most common error associated with fertilizer P recommendations. This suggests that the agronomic recommendations were skewed to minimize yield loss from under-fertilization.

Soil-test-based fertilizer recommendations should clearly communicate the frequency and magnitude of yield response to fertilization so that end-users can make well-informed nutrient management decisions that include both agronomic and economic considerations.