

2011 Statewide Nutrient Management Benchmarking Project:

# Potassium Status

## Problem addressed

Identifying corn and soybean K status has both agronomic and environmental implications. Information about distribution of soil and tissue P test values across the state have never been compiled and analyzed.

## Soil and tissue testing: Corn

Across Iowa, the median soil K value was 162 ppm, with 75% of soil test values ranging from 126 to 212 ppm (Fig 1A). The median value was 162 ppm, which was the same as that reported in the 2010 International Plant Nutrition Institute survey for Iowa.

Based on Iowa State University interpretations, about 30% of samples were in Very Low and Low categories (Fig. 1B). The percentage of Very High and High samples was about 45%, indicating relatively high soil K levels in some Iowa soils. Fields with history of manure application had a slightly larger percentage of Very High samples.

The distribution of corn tissue K categories (Fig. 1D) did not exactly match that of the soil P test categories (Fig. 1B). Based on Midwest Labs interpretations, about 45% of tissue samples were Deficient and Low and about 30% of samples were High and Excessive in K.

## Soil and tissue testing: Soybean

The distribution of soil K test categories for soybean (Fig. 2B) did not match that of soybean tissue K categories (Fig. 2D). Based on Midwest Labs interpretations, about 70% of soybean samples were considered Deficient. Only about 15% of samples were classified as Sufficient or High. The relatively large percentage of Deficient samples could be partially explained by relatively dry and hot weather conditions observed in July and August of 2011. However, we could not find an association between monthly rainfall and soil K or tissue values.

For both corn and soybean, tissue K values tended to be higher with soil K values, but the soil test could explain only about 10% the total variability tissue K values (data not shown).

## Interaction with Phosphorous

Soil K values positively correlated with soil P values (see P status poster). This trend may be attributed to fact that P and K fertilizer are applied at the same time and P and K levels in Iowa soils increase together. This also may complicate the interpretations of crop status of one of the two nutrients if another one is Deficient.

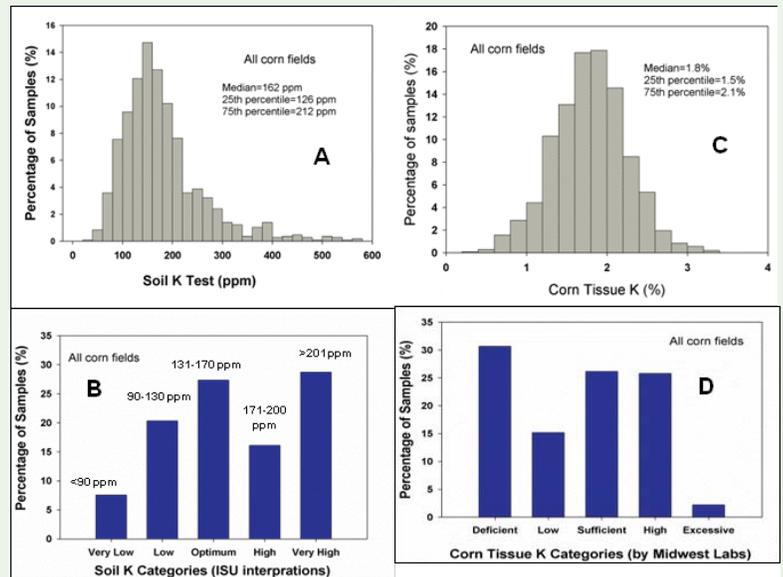


Fig. 1. Distribution and sufficiency categories of soil K test values and ear leaf K concentrations for 505 corn fields sampled across Iowa in 2011.

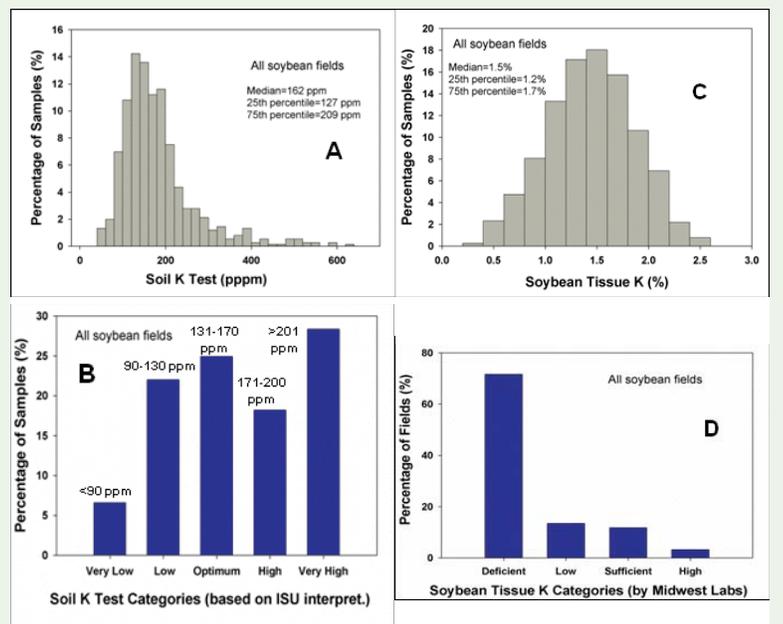


Fig. 2. Distribution and sufficiency categories of soil K test values and K concentrations of fully developed trifoliates for 376 soybean fields sampled across Iowa in 2011.

## General Comments

In this study soil K test values may have been lower because of slightly earlier than usual soil sampling and relatively dry soil conditions in some parts of the state. The tissue test categories needs to be verified by yield response data. Currently, ISU research does not support the use of tissue K test for

predicting yield responses to K fertilizer. Despite the fact that many factors may influence in season tissue K values, a large portion of soybean samples was classified as Deficient. In the end, the question is whether this observation is a one year phenomenon or whether it's a common trend across Iowa.



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