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COULD INADEQUATE P AND K CAUSE POOR CROP N USE?

Economic pressures and elevated input costs the last 2 years have resulted in some reductions in fertilizer applications in many parts of the country. While many of the reduced fertilizer input decisions have been viewed as temporarily necessary, to stay within operating budgets and borrowed capital limits, it would be wise for farmers and their crop advisers to consider the impacts of such reduced fertilizer inputs for the 2010 crop year.

Wise use of fertilizers in prior years (i.e. before 2008-2009) may have allowed some farmers to “coast” a year or so and rely on built-up soil P and K fertility. Developing and maintaining high soil test P and K levels enabled some farmers with greater flexibility in nutrient management during tough economic times. How have fertilizer use reduction decisions affected soil fertility levels? Many folks do not understand that even yearly soil sampling and testing...because of the wide annual and seasonal variations in moisture and temperature... may fail to detect significant changes in soil P and K levels from year to year.

Last year proved to be a very wet one for much of the U.S., especially in the Corn Belt where weather conditions were favorable for good yields and resulted in higher crop harvest nutrient removal than in previous years. To assess crop nutrition needs for 2010, farmers should consider their individual fields, long-term soil test P and K fertility trends, current soil sample results, and the budget estimation of P and K inputs vs. crop harvest removal. The International Plant Nutrition Institute (IPNI) has posted crop harvest nutrient removal values on-line at: www.ipni.net/nutrientremoval. These values can be used to help inform nutrient budget estimations, in the absence of on-farm, specific crop nutrient removal values based on grain and harvested crop nutrient analyses.

Inadequate or below-recommended applications of P and K can lower yield potential and impair the efficiency of use of all crop inputs—including N. For example, long-term corn nutrition research by agronomic scientists at Kansas State University showed that neglect of adequate P nutrition can lower yields more than 30%, and result in a 66% build-up in soil profile nitrate-N. Such soil nitrate-N residual may pose serious threats to ground-water and to surface water resources through drainage interception by tile lines or via lateral flow to streams and rivers. The inefficient crop use of N, induced by inadequate P nutrition, also represents significant lost revenue.

Research with corn by Ohio State University agronomists several years ago showed that inadequate or below-recommended K nutrition can also impair crop N use and lead to less crop N uptake and recovery in plants and the soil. In the Ohio research, adequate soil K nutrition (soil test K above 135 ppm or above about 270 lb/A) resulted in an optimum corn yield of more than 208 bu/A with roughly 190 lb of N/A. At low soil test K levels (below 100 ppm), about 275 lb N/A were required to achieve peak corn yields of about 167 bu/A, which was about a 20% reduction in yield. The better soil K nutrition approach resulted in more than a doubling of N recovery in the plant biomass, which translates to potentially less residual nitrate-N left in the soil and a lowered risk for loss to the environment.

As plans are made for 2010, ensure that crop yield potential is not limited by the continued mining of soil P and K fertility. Collect and analyze representative soil samples, evaluate nutrient input and crop harvest removal budgets, and consult your crop adviser, fertilizer dealer, or Extension agent. Develop a strategy for strong crop performance, improved nutrient use efficiency and effectiveness, and better profits in 2010. Don't let P and K neglect damage the results you should be getting from your fertilizer N applications.

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Abbreviations: N = nitrogen; P = phosphorus; K = potassium; ppm = parts per million.

Note: *Plant Nutrition TODAY* articles are available online at the IPNI website: www.ipni.net/pnt