Fluid Fertilizer Foundation
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Soil Test Levels Important

Think Longer-term

The following article is a news release from Dr. Gyles Randall, Soil Scientist, University of Minnesota. What he points out is that there are risks associated with continually managing P in the low soil test range and that there are long-term aspects of P fertility programs that need to be kept in mind. I might point out that this is not the only research indicating that fertilizer P may not substitute for P fertility on soils deficient in phosphorus.

Dr. Randall is a long time research project leader with the Fluid Fertilizer Foundation - much of this research dealing with P management.

Dale F. Leikam
Fluid Fertilizer Foundation

High Soil Test P Essential for Maximum Corn Yields and Profits

With elevated prices of phosphorus (P) fertilizer and a majority of land being rented, P management, in terms of understanding optimum soil P tests, P application rates and methods of application, has become critical as farmers attempt to maximize profitability of their fertilizer dollar. Results from two studies at Waseca confirm that very high P-testing soils (Bray P = 22 ppm) produce greater and more profitable corn yields without additional fertilizer P than low P-testing soils where recommended rates of P are applied.

In one study on a Webster soil (pH 6.6) at Waseca, 30 plots have been maintained at Bray P1 soil test values ranging from 4 to more than 40 ppm. A corn-soybean rotation has been grown where no P was applied for the year corn was grown. Corn yields were optimized at > 12 ppm Bray P1 in 2006 (a warm spring) and at >22 ppm in 2004 and 2008 (cool springs). Since higher yields are generally obtained with early planting (soil temperatures are cool) and spring soil temperatures are not predictable, these results clearly indicate farmers can reduce the risk of reduced yields and profit by keeping soils at levels greater than 22 ppm Bray P1.

A second study was conducted on both low (L) P and very high (VH) P-testing soils to evaluate optimum P placement methods [pop-up (in-furrow), 6” deep-band under row, and broadcast]. Corn was grown on both L and VH P-testing soils in 2005, 2006, and 2007. Phosphorus was applied for corn at rates of 0, 25 and 50 lb P_2O_5/A. Soybeans were planted the following year at each site to determine residual effects of P applied for corn; no additional P was applied for soybean. Soil test P averaged 7 ppm (L) at the three low P-testing sites and 25 ppm (VH) for the three higher-testing sites. Soil pH averaged 5.9. Corn was planted following field strip tillage, and soybeans were no-till planted.

Three-year corn yields averaged 193 bu/A on the VH P-testing soils with no yield response to added fertilizer P. On the L P-testing sites, yields averaged only 167 bu/A even when 50 lb P_2O_5/A was band-applied each year (the UM recommendation for 195 bu/A corn is 40 lb/A when band-applied). Soybean yields in the following year averaged 49 bu/A on the VH P-testing soils without added fertilizer P and 39 bu/A on the low P-testing soils that had received P for corn the previous year. The corn and soybean yield advantage of 26 and 10 bu/A, respectively for the VH P-testing sites clearly points out the economic penalty (up to $100/acre/year) associated with low P-testing soils even when P fertilizer is applied. Thus it is important for farmers to know the soil test P status of their fields, especially those rented or recently acquired

Dr. Gyles Randall
Soil Scientist
University of Minnesota