

Soil test P levels -- how high is high enough?

One common question this spring is "can I cut back on my phosphorus fertilizer rates?" The common answer is "it may be ok to cut back if your soil test P levels are above the critical levels. The problem is defining the critical level. That answer varies from 15 ppm Bray 1 in Minnesota to 30 ppm in Iowa and Illinois.

A five-year study (3 corn years) at the University of Minnesota of Minnesota experiment station in Waseca concluded that corn yields were optimized at >12 ppm in 2006 (a warm spring) and at >22 ppm in the cool springs of 2004 and 2008. Most research suggests that higher yields are possible with early planting when soils are cooler. Farmers can reduce the risk of reduced yields and profit by keeping soil test levels greater than 22 ppm Bray 1.

A second 3-year corn study compared yields on low P-testing soils (7 ppm) and high P soils (25 ppm). Three-year corn yields averaged 193 bu/A on the high testing P soils with no response to added P fertilizer. The low P-testing locations only produced yields of 167 bu/A even when 50 lbs P₂O₅/A were banded. The University of Minnesota recommendation would have been 40 lbs P₂O₅/A when band applied. Soybean yields the following year averaged 49 bu/A on the high testing soils without additional P application. The low testing soil had a yield of 39 bu/A.

This study clearly points out that there is an economic penalty (up to \$100/acre) associated with low P-testing soils even when P fertilizer is applied. Any cut back in phosphorus fertilizer this spring will lower the soil P levels for 2010. Cool/wet soils can cause short-term phosphorus deficits until the soils warm enough for adequate mineralization. Eliminating a phosphorus application in cool soil conditions is extremely risky. Farmers must also know their current soil test P levels and evaluate if cutting back will drop their soils below the "high" levels. Farmers should be cautious when renting new ground to establish realistic yield goals.