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Defining “High P” Soils in Delaware

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Introduction

Phosphorus (P) is an essential nutrient for optimum plant growth. However, continued application of manures and fertilizers to soils has led to an accumulation of P in many Delaware soils to levels well above those needed for optimum crop growth.

In Delaware, soil test P is considered to be above the agronomic optimum (also classified as “excessive”) when Mehlich-3 P concentrations exceed 100 FIV (equivalent to 100 ppm or 200 lb/acre Mehlich-3 P). Scientific evidence suggests that when soil P levels increase beyond the agronomic optimum, the risk of P losses from the field also increases. When P is lost from soils, it can end up in surface water bodies (streams, lakes, bays, etc.) and lead to biological and ecological problems.

What is a “High P” Soil in Delaware

The Delaware Nutrient Management Act, which was passed in 1999 and updated in 2024, requires most individuals who raise livestock or who apply nutrients to land to become nutrient management certified. This law also requires that properties with more than 10 acres of fertilized land must have a nutrient management plan. A critical step in the development of a Delaware nutrient management plan is determining if there are any fields with “high P soils”. The Delaware Nutrient Management law (3 Del. C. § 2202) defines a “high P soil” as any soil with a Mehlich-3 soil test value greater than 150 FIV (equivalent to 150 ppm or 300 lb/acre). Therefore, this legal definition of “high” P soils is different from the agronomic interpretation of high or excessive soil test P (>100 FIV).

According to Delaware law (3 Del. C. § 2247), applications of P to “high P soils cannot exceed the total phosphorus removal in a planned crop rotation unless a different management practice is permitted after conducting the Delaware PSI risk assessment tool”. This statement is critical to any producer who usually applies animal manures at rates needed to meet the nitrogen (N) requirements of the crop. For example, when poultry litter is applied to meet the N demands of corn, the amount of P that is being applied is typically about 1.5 to 2 times more than the crop will need. This restriction of applying only P on a rotational removal rate for “high P soils” should have no impact on producers who use fertilizer to meet the P demands of their crops because these producers would not typically apply more fertilizer P than required to meet the P demands of the crop.

Phosphorus Management Requirements for “High P” Soils in Delaware

The Delaware P Site Index (PSI) is a risk assessment tool to determine the relative risk of P loss from soils to water. The DNMC has adopted the Delaware PSI as a best management practice. The Delaware PSI takes into account the P sources (e.g., soil, fertilizer, manure) and site characteristics (e.g., slope, drainage class, permeability, and distance to water) that influence the potential for P losses from the field. Fields are then rated based on relative risk for P losses (i.e., low, medium, high, very high) and P management is then recommended based on this score. Therefore,

it is possible that a field could have a soil test P concentration greater than 150 FIV but have a Delaware PSI rating that shows a "low" risk of P loss from the soil, which would allow growers to apply additional manure at rates that exceed rotational crop P removal. Practitioners of the Delaware PSI are strongly encouraged to review the *Delaware Phosphorus Site Index Technical Guidance Manual* at **http://www.udel.edu/00151** for detailed instructions on how to conduct field assessments using the Delaware PSI. Results of the Delaware PSI assessment are valid for 3 years.

According to the law (3 Del. C. § 2247), growers managing "high P soils" soils with Mehlich-3 soil test P concentrations that exceed 499 FIV (499 ppm or 998 lb/ac) are required to run a PSI risk assessment prior to any P application. If the PSI rating is "very high", no additional P application is permitted. Phosphorus application is allowed if the rating is low (rotational N-based applications permitted), medium (rotational N-based application permitted in one year of the rotation), or high (rotational P-based application permitted). Growers managing "high P soils" with Mehlich-3 soil test P concentrations between 150 and 499 FIV can opt to apply based on rotational P removal rates without a Delaware PSI assessment. Alternatively, these growers may conduct a Delaware PSI assessment to determine if other P management strategies (i.e., N-based management) are permitted. If a grower opts to conduct a Delaware PSI on fields with Mehlich-3 P between 150 and 499 FIV, they will not be permitted to apply P if the assessment results in a "very high" risk for P loss.

References

Nutrient Management, Delaware Administrative Code Title 3 Section 22. (3 Del. C. § 2247). https://delcode.delaware.gov/title3/c022/sc03/index.html

Nutrient Management Certification Regulations, _D.E. Administrative Code, Title 3, § 1201. (23 DE Reg. 1201). https://regulations.delaware.gov/AdminCode/title3/1200/1201.shtml#P2_24

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