Phosphorus in Soil and Tile Water as Affected by Fertilizer and Manure Applications to Artificially Drained Iowa Fields. (S11-mallarino111321-Poster)

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Abstract:

Phosphorus can move through the soil profile and reach water bodies with subsurface tile flow. We assessed the relationship between P concentration in tile water and soil P measured with agronomic (Bray-P1, Mehlich-3, Olsen) and environmental (Fe-oxide coated paper, water extractable, and Mehlich-3 P:Al+Fe saturation index) tests. Soil and water samples were collected from plots of three trials fitted with tiles in central and northeast Iowa during 3 yr. Treatments included various rates of P fertilizer and poultry or liquid swine manure for the corn-soybean rotation. Soil (15-cm depth) Bray-P1 values were 14-110 mg/kg across plots and years. Phosphorus accumulated in the 15-30 cm soil layer when P rates exceeded crop removal, but did not accumulate at deeper depths. Dissolved reactive P in water (DRP) was not correlated with any soil P test. However, DRP usually was <0.05 mg/L when Bray-P1 was approximately <85 mg/kg and as high as 0.1 mg/L when Bray-P1 increased up to 110 mg/kg. All soil tests showed similar relationships between soil P and P loss. Soil P as high as four times levels that optimize crop yield did not significantly increase P loss through tiles in these soils.

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