Near-Surface Moisture Effects on Phosphorus Losses Under Simulated Rainfall. (S11-joern121801-Oral)

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Abstract:

Soil moisture impacts on phosphorus (P) losses is of interest in seasonally saturated agricultural soils. Our experiment was conducted on a Sleeth silt loam provided swine slurry, potassium phosphate, and commercial fertilizer (18-46-0) subjected to matric potentials of -0.2 or -1.8 kPa over 28 days. Redox potential (Eh) was measured daily at 2 and 10 cm from the soil surface. Rainfall simulations (75 mm/hr) were conducted at 7, 14, and 28 days. Runoff samples were analyzed for dissolved reactive P (DRP), bioavailable P (BAP), total Kjeldahl P (TKP), and sediment. Concentration and loads of DRP, BAP, TKP, and sediment were significantly greater under the high matric potential compared to the low matric potential. Bioavailable P was greatest in the high slurry rate, but P source did not significantly impact DRP or TKP. Soil Eh decreased with time and depth, and were significantly lower in the high matric potential treatment. Although our results showed that P losses were largely due to accelerated sediment losses under the high matric potential condition, DRP, pH and Eh data indicate that reductive dissolution of P minerals may be occurring near the surface and influence runoff P losses from saturated soils.

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Presentation Information:

Presentation Date: Wednesday, November 13, 2002
Presentation Time: 8:45 am

Keywords:

phosphorus, runoff, manure, oxidation-reduction