Soil and Runoff Phosphorus Relationships for Five Typical Iowa Soils. (S11-mallarino110428-Poster)

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Abstract:

Understanding P relationships in surface soil and runoff is important to assess the risk of P delivery to surface water bodies. We used an indoor rainfall simulation method to evaluate relationships between soil P and runoff P loss for five Iowa soils (Fayette, Harps, Marshall, Nicollet, and Tama). Soils were incubated four weeks with five rates of mono-ammonium phosphate. Soils were analyzed with the agronomic P tests Bray-P1, Olsen (OP), and Mehlich-3; the environmental Fe-oxide coated paper (FeP), water extraction (WP), Mehlich-3 P:Al+Fe saturation index, and P sorption index; and for total P. Runoff was analyzed for dissolved reactive P (DRP), bioavailable P with the Fe-oxide coated paper test (BAP), and total P. Olsen P ranged from 3 to 640 mg/kg. Soil-test P, soil P saturation, and runoff P increased linearly with P additions. Runoff P increased linearly with increasing soil-test P or soil P saturation. The Harps soil (calcareous) had comparably higher runoff P loss at the higher P rates than other soils, most likely because of decreased soil pH. The Olsen, FeP, and WP tests showed the best correlations (0.93 to 0.98) with DRP and BAP in runoff across the tested Iowa soils.

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