Phosphorus Loss by Leaching from a Grassland Soil Following Repeated Additions of Farm Dairy Effluent. (S11-sims105155-Oral)

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Abstract:

Preferential flow can result in elevated concentrations of phosphorus (P) in leachate/surface runoff particularly following application of animal waste, which in turn may contribute to accelerated eutrophication of natural waters. This study evaluated P leaching from a grassland soil immediately following application of farm dairy effluent (FDE). Intact monolith lysimeters (50-cm diameter, 70-cm depth) were collected from a Lismore silt loam soil (Udic Haplustept) under pasture. Treatments included applications of mineral P fertilizer (45 kg P ha-1) with and without farm dairy effluent (FDE: 200 and 400 kg N ha-1), and cow urine (1000 kg N ha-1). Leachate was collected on 8 occasions following FDE application between August 1999 and May 2001. Dissolved reactive P (DRP) and total dissolved P (TDP) were determined on filtered (<0.45 mm) whereas, total reactive P (TRP) and total P (TP) were determined on unfiltered leachate and FDE samples. Of the TP losses that occurred over the two years from the FDE treatments, 44-61 % (1.9-2.6 kg ha-1) was lost during the 8 drainage events that occurred within 24 hours following FDE application. Concentrations of TP determined in the leachate were commonly 0.1-0.4 mg L-1, although P concentrations immediately following FDE application were often up to 2.5 mg L-1. This was attributed to preferential flow, which resulted in rapid transport of unreactive P (mainly organic P) from the applied FDE. Therefore, short-

term strategies for reducing P loss in this free-draining soil should aim to increase the residence time of applied P from FDE within the soil.

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