A Risk-Based Approach to Phosphorus Management on Manured and Non-Manured Soils

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Eutrophication of surface waters often is related to phosphorus (P) runoff from agricultural fields. We evaluated P runoff from 17 furrow-irrigated fields in three different watersheds in Colorado in order to to examine the relationship between soil test P and P forms in runoff, to evaluate the use of the P Index for furrow-irrigated fields, and to determine the impact of manure application on P runoff potential. Soil test P (STP) from shallow samples (0-1 inch) taken from the furrow only was significantly correlated to ortho-phosphate, total soluble P, and bioavailable P concentrations in runoff. The P Index was not significantly correlated to any form of P measured in the runoff. However, the length of irrigation run (not included in the P Index) and the Irrigation Erosion factor from the P Index can be used to predict bioavailable P (r^2=0.81). Manured fields tended to have higher concentrations of ortho-phosphate, total soluble P, and bioavailable P in runoff than non-manured fields; however, the soluble organic P concentration was significantly higher in runoff from non-manured fields than from manured fields. STP was highly significantly correlated (r=0.85) with the P Index factor, Manure Application Rate (MAR).

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