

PHOSPHORUS RUNOFF FROM CONVENTIONALLY TILLED WHEAT FIELDS

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SUMMARY

Long-term manure and fertilizer application to soils at rates in excess of crop uptake can result in elevated soil test P (STP) levels. Most runoff studies were directly related to animal manure land applications on pastures. The relationship between STP and runoff P on fields only received inorganic P fertilizers on cultivated fields, however, is not well documented and probably poorly understood. This study established the relationship between soil test P and surface runoff P on two long-term soil fertility research plots received different P rates annually for over 30 years (Stillwater and Lahoma, OK). A rainfall simulator was used to generate runoff after plots were prepared to plant winter wheat. Soil test P increased as P fertilizer rates increased. Both dissolved reactive P and total P in the runoff were highly correlated with Mehlich 3 soil test P ($r^2 > 0.98$), but slopes of the regression lines were different for different soils. Majority P in the runoff of plowed wheat fields was sediment bound (86% and 55% for Stillwater and Lahoma location, respectively). This suggests that both the source and transport factors are important in controlling P loss to water bodies. Preventing soil test P from building up and reducing runoff and erosion will minimize the impact of agriculture on the environment.