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CROPPING SYSTEM AND SEASON OF APPLICATION OF POULTRY LITTER AFFECTED RESIDUAL SOIL P CONCENTRATION

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Background. Broiler enterprises produce excess manure for environmentally safe recycling in cropping systems. Application frequencies and rates are often excessive and lead to nutrient accumulation. The recommended practice is to apply litter according to the N needs of the crop. When litter is applied in this manner, P can accumulate, resulting in levels that are detrimental to plant growth and increase the risk of non-point source pollution of surface water. Phosphorus addition to surface waters from non-point agricultural sources is an increasing resource management concern. Phosphorus has been regarded as the primary nutrient controlling biological activity in surface waters.

A study was initiated in spring 1992 to investigate the effect of different vegetable cropping systems and season of application on P accumulation from poultry litter. The spring crops were tomatoes and sorghum-sudan, and the fall crops were turnips and rye. The cropping systems studied were spring cover followed by fall vegetable (SC-FV), spring vegetable followed by fall cover (SV-FC), and spring vegetable followed by fall vegetable (SV-FV). Litter was applied in either the spring, fall, or both spring and fall. The information presented covers a period of fall 1992 through fall 1993. Spring of 1992 data are not reported since there was no system until the beginning of fall 1992.

Research Findings. The initial P concentration of the surface 6 in. of soil in the experimental area was approximately 17 ppm. All treatments increased P accumulation over time when compared to the control (Fig. 1). A cropping system of SV-FC greatly reduced P accumulation regardless of season of application. A significant reduction was also noted when this system was compared with the other two cropping systems (SC-FV, SV-FV). In all systems, the greatest accumulation was when litter was applied in both spring and fall with the least from a spring-only application.

Application. Results to date indicate that a management practice of applying litter only to a spring vegetable crop and planting a fall cover crop would greatly reduce P accumulation. If there is excess litter that cannot be disposed of from a once-per-year application, then a twice-per-year application could be made under this cropping system. The information indicates that the potential for excess P accumulation would be greatly reduced.

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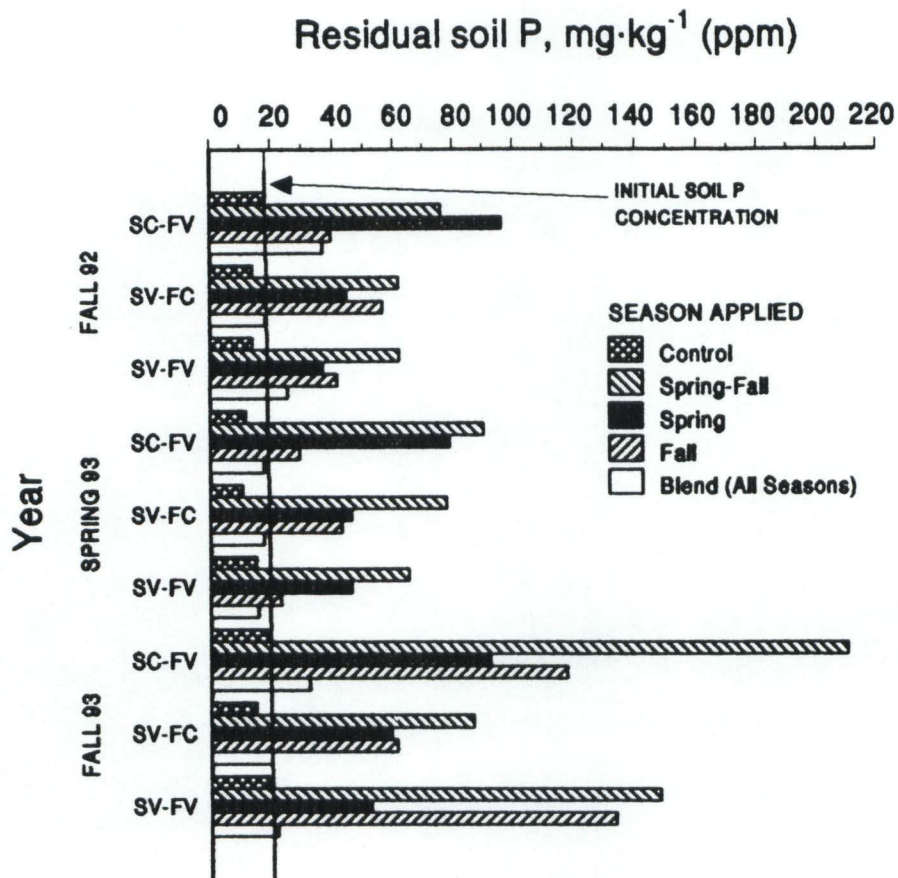


Fig. 1. Residual soil P from poultry litter as influenced by cropping system and season of application over 3 growing seasons. SC-FV = spring cover-fall veg.; SV-FC = spring veg.-fall cover; SV-FV = spring veg.-fall veg.