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EFFECT OF CROPPING SYSTEM ON RESIDUAL SOIL P FROM POULTRY LITTER APPLICATION

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Background. Poultry litter rates are generally based on crop N requirements. When litter is applied to meet the N needed, P can accumulate. Excess accumulation of P can be detrimental to plant growth and increases the risk of non-point source pollution of surface water. Little information is available concerning the fate and management of litter supplied P in soil. Cover crops can be used to recycle nutrients or remove excess nutrients through grazing, hay or silage. A three-year study was initiated in spring 1992 at the Texas A&M University Agricultural Research and Extension Center at Overton. The purpose was to investigate the feasibility of growing warm- and cool-season annual forage crops to remove excess nutrients supplied by litter in rotational cropping, vegetable systems.

Research Findings. Experimental treatments were applied each spring and fall through spring 1994. Spring crops were tomatoes and sorghum-sudan. The fall crops were turnips and rye. Fertility treatments were a control, recommended litter to furnish the N need of the individual crop (1X), twice the recommended rate (2X), and a commercial blend fertilizer. Systems were spring vegetable-fall forage, spring forage-fall vegetable, and spring vegetable-fall vegetable. Information presented covers spring 1992 through fall 1993.

Cropping system and rate of litter application increased residual P in the surface 6 in. of soil (Fig. 1). The initial soil P was 17 ppm. In spring 1992, only vegetables and cover crop are shown. The highest increase in P over time was due to 2X rate applied in a cropping system of spring cover-fall vegetable. This increase was also demonstrated by 1X rate applied in the same system. A system of spring vegetables followed by fall cover lowered accumulation from 1X and 2X rates. Only a slight accumulation of P above the initial concentration was observed when fertilizer blend was applied regardless of season of application.

Application. A cropping system of spring vegetables-fall cover would be best for reducing P accumulation. Using this system, litter rates could be doubled without drastically increasing P accumulation.

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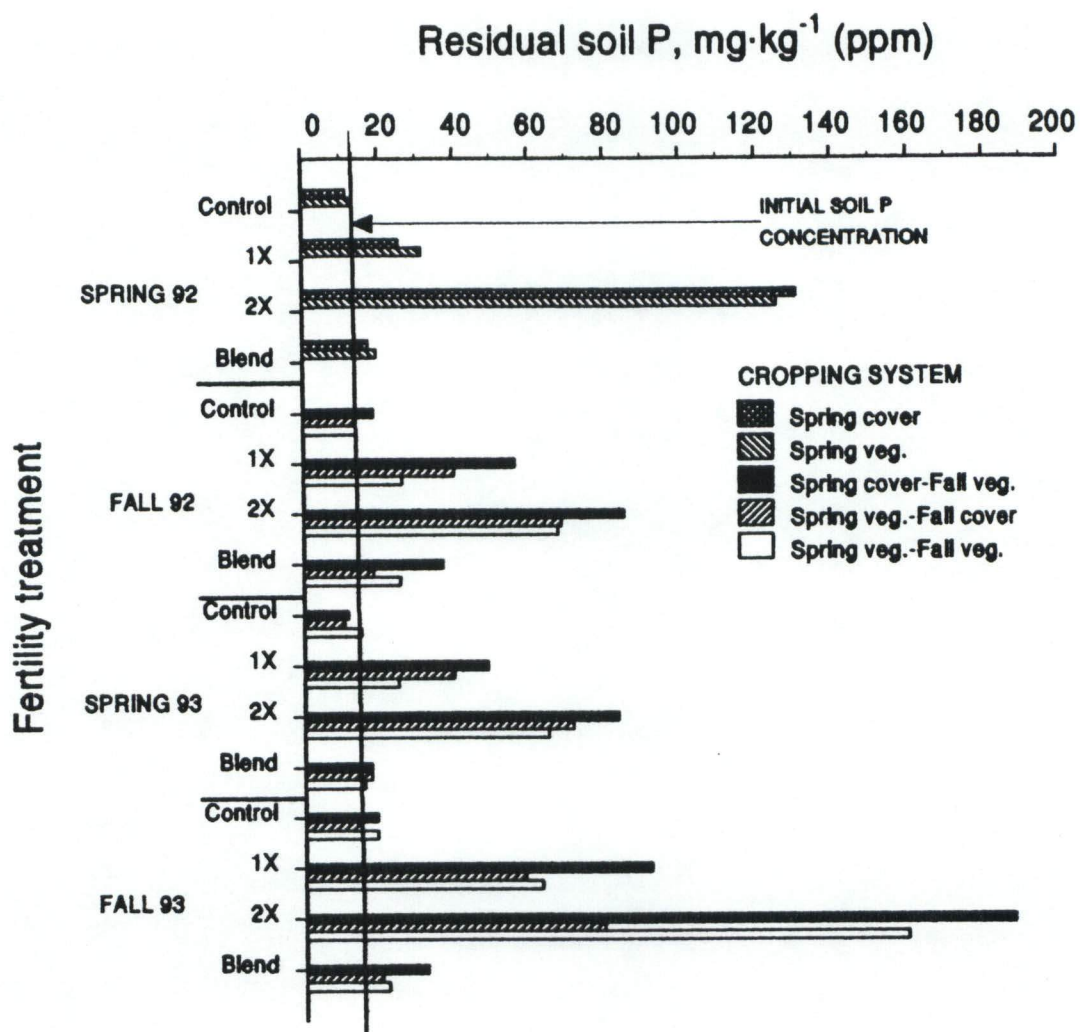


Fig. 1. Residual soil P as influenced by cropping system and fertility treatment over 4 growing seasons.