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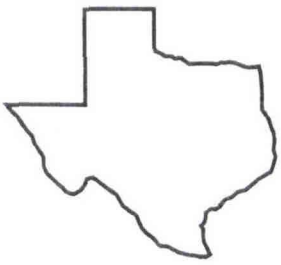
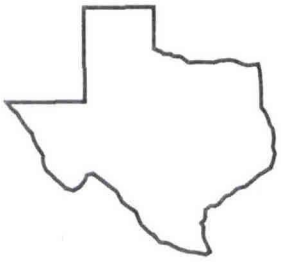
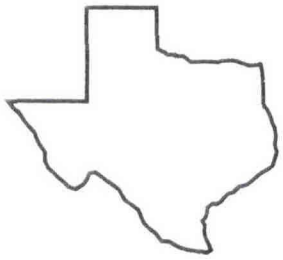
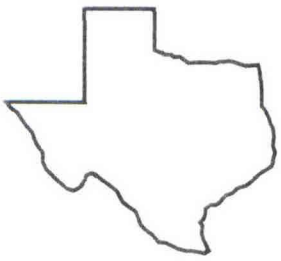




Overton Field Day Report - 1994





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PHOSPHORUS ACCUMULATION IN SOILS FOLLOWING APPLICATIONS OF POULTRY LITTER AND DAIRY EFFLUENT

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Background. Poultry litter and dairy effluent are commonly used as nutrient sources applied to pastures in East Texas. However, concern has arisen that the high level of phosphorus (P) relative to nitrogen (N) in animal wastes may result in excessive accumulation of P in soils. This has been of particular concern when high rates of poultry litter are applied since it contains almost equal levels of N and P. However, most grasses use less P than N for growth. The objectives of this research included monitoring the movement of P from animal wastes through the upper 6 ft of a sandy, East Texas soil.

Research Findings. An existing stand of Coastal bermudagrass was divided into 32, 10x15-ft plots. These plots were organized into 8 treatments with 4 replications of each. Treatments were 0, 225, 450, or 850 lbs/ac total-N from dairy effluent or poultry litter with the accompanying levels of P. In Figures 1 and 2, soil P from dairy effluent and poultry litter, respectively, is shown for four rates of P_2O_5-equivalent. These P_2O_5 rates were a result of the P content of the waste in the four N-rate applications. Thus, at 0, 225, 450, and 850 lbs/ac N from dairy effluent, the accompanying P content expressed as P_2O_5 was 0, 62, 124, and 248 lbs/ac, respectively. Likewise, these four levels of N in poultry litter resulted in 0, 207, 414, and 824 lbs of P_2O_5 per acre equivalent, respectively. Each waste treatment was split into four applications (May, July, October, and March). Soil samples were collected in January and August of 1993. Samples were analyzed for EDTA-extractable phosphorus to best approximate the short-term availability of P in soil solution.

Data indicated that the high application rate of poultry litter did result in significant movement of P to the 3-ft soil depth. All other treatment rates had no significant effect on the movement of P below the upper 1-ft of the soil profile.

Application. It is generally understood that P will not move below a few inches in most agricultural soils. However, it is apparent from these results that in the coarse, sandy soils and high rainfall conditions of East Texas, some movement of P does occur. Given the tendency of applications of animal waste based on N to result in excessive levels of P, some adjustment in the prevailing fertilization practices may be warranted. It has been suggested that animal wastes, particularly poultry litter, should be applied based on the P requirement of the recipient crop, and any resultant N deficiency corrected with commercial N fertilizer. This could prevent the over-application of P from resulting in phosphorus-loading of soils.

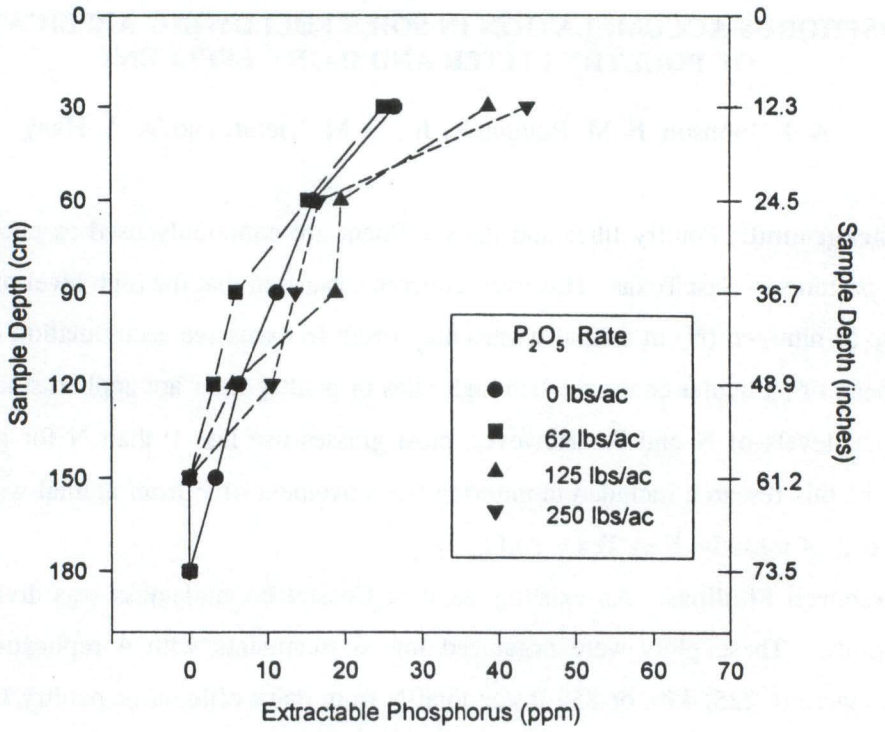

Figure 1 - Soil phosphorus concentration as affected by dairy effluent application and soil depth.

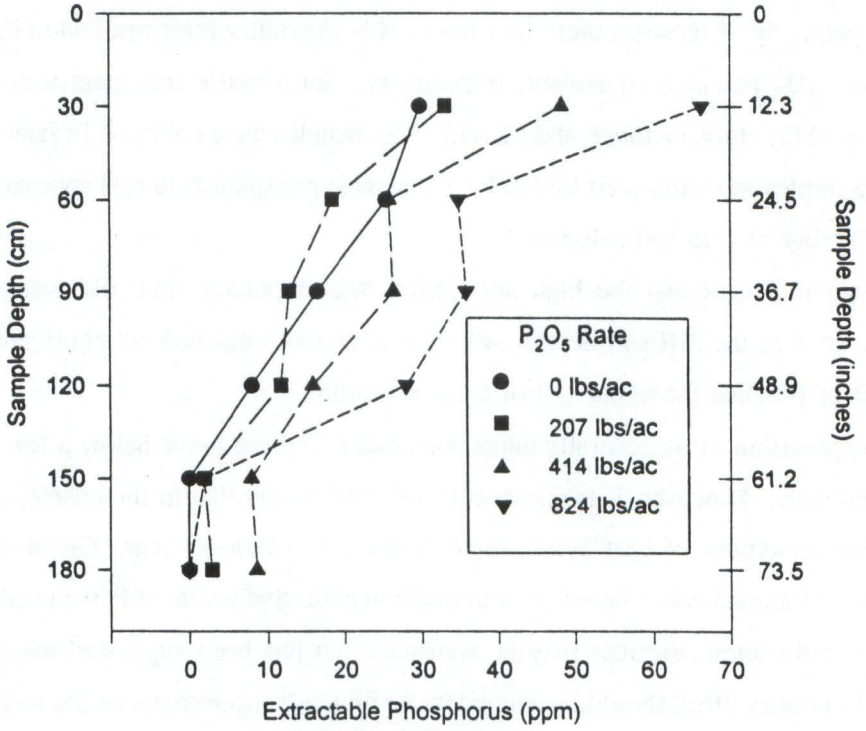

Figure 2 - Soil phosphorus concentration as affected by poultry litter application and soil depth.