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Nutrient Dynamics in Integrated Animal and Cropping System

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Abstract Text:

The North Carolina swine industry provides 23% of state's agricultural receipts. Soil nutrient concentrations increase when hogs are raised continuously in the feedlots for years. Application of swine manure to cropland is one of the most obvious methods of recycling plant nutrients. By integrating animal and cropping systems, farmers may be able to develop organic soils by utilizing the rooting behavior of the hogs to incorporate their manure into mulch. An experiment was established in summer, 2000 for two years at North Carolina Agricultural and Technical State University research farm on Enon Sandy loam (Fine, Mixed Thermic Ultic Hapludalf) soil. Six gestating sows were maintained on four different treatment plots measuring 20m x 20m in a randomized complete block design. Treatments included plots with: 1) leaves and no pigs, 2) leaves with pigs, 3) no leaves and no pigs and 4) no leaves with pigs. Soil samples were collected in years 2000 and 2002 at planting and at harvest at depth increments of 0-15 cm, 15-30 cm and 30-60 cm. Samples were analyzed for soil NO₃--N, inorganic N, PO₄, Total P, organic matter, total C, total N, C:N, and CEC. Plant samples were collected in both years for Corn Dry matter Yield and N Biomass. Fertilizer was applied to plots without pigs so that the crop was not deficient in nutrients. Plots with pigs had a significant increase in NO₃--N, Inorganic N and PO₄ concentrations. The concentrations decreased after plant uptake in both the years 2000 and 2001.

Impact Statement:

Out side swine growing operations can be subjected to nutrients runoff in to near by creeks and degrade water quality. The integrated animal-crop management system can eliminate this problem and help water quality.