

FIELD DAY REPORT - 1996

TEXAS A&M UNIVERSITY AGRICULTURAL RESEARCH and EXTENSION CENTER at OVERTON

**Texas Agricultural Experiment Station
Texas Agricultural Extension Service**

Overton, Texas

June 20, 1996

Research Center Technical Report 96-2

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EFFECT OF CROPPING SYSTEM ON NO₃-N CONCENTRATION OF SURFACE RUN-OFF WATER AND LEACHATE FROM POULTRY LITTER APPLICATION

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Background. Broiler production is increasing in the South. Expanded production increases the amount of poultry litter requiring disposal in a timely and environmentally sound manner. Manure supplied nutrients can accumulate, thus increasing the risk of pollution and movement of nutrients, especially NO₃-N, into surface water and soil water percolate.

A study was initiated in fall 1992 to investigate nutrient loss due to run-off and leaching in a vegetable, forage, litter management system. The cropping systems were spring vegetable-fall forage, spring cover-fall vegetable, and spring vegetable-fall fallow. The spring crops were sweet corn and sorghum-sudan, and the fall crops were broccoli and rye.

Graded troughs lined with 6-mil black plastic were established at the ends of the experimental plots and connected to Parshall flumes. Containers were installed at the end of each flume to intercept a portion of the run-off to determine nutrient loss. For determining loss in the soil solution, vacuum extraction tubes equipped with porous ceramic tips, were placed in each plot to a depth of 4 ft. Samples were obtained after each major rainfall event.

Research Findings. Negligible amounts of NO₃-N in run-off water were observed from any cropping system (Fig 1). This could be explained by the fact that all litter treatments were incorporated by power tilling prior to planting. This greatly reduced the amount of exposed litter that could be moved in surface run-off water. Cropping system had a significant effect on leachate concentration. A two-fold decrease in NO₃-N concentration was found when a system of spring vegetables followed by fall cover is compared to the other two systems.

Application. A systems approach has been beneficial in reducing N concentration in the soil solution. Utilizing cover crops in a spring vegetable production system greatly reduces the concentration of NO₃-N in soil water leachate. Soil incorporation of litter will greatly reduce incidents of non-point source pollution of surface water. The information gained from this study will be beneficial to producers by helping them develop management plans that will qualify for Best Management Practices (BMP's).

Acknowledgement. This study was supported in part by a grant from the Southern Region Sustainable Research and Education Program.

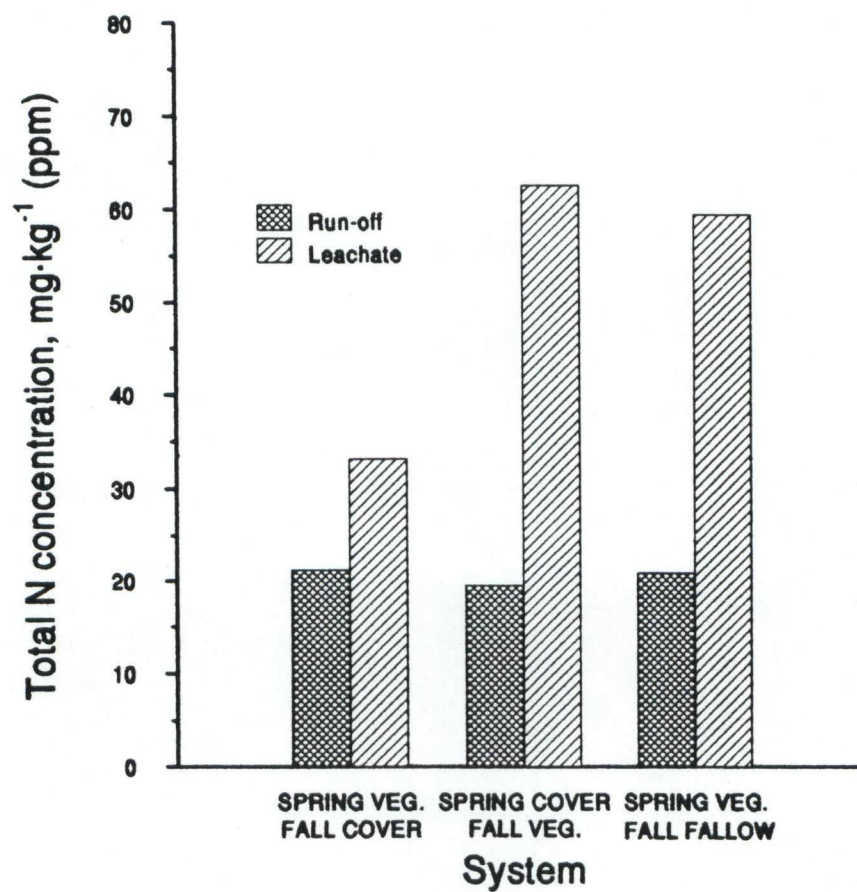


Fig. 1. $\text{NO}_3\text{-N}$ concentration of surface run-off water and leachate samples obtained at 122 cm (4 ft) depth from 3 cropping systems in spring 1993.