

On-Farm Economic and Environmental Impacts of Poultry Litter Fertilizer

Since 2000, researchers with USDA-ARS and Texas A&M AgriLife Extension have studied the on-farm environmental and economic effects of land-applying poultry litter with funding provided by USDA and TSSWCB. This study was designed to produce scientific data on the impacts of land application for landowners interested in using poultry litter fertilizer for crop or forage production.

The research was conducted at the USDA-ARS Grassland, Soil and Water Research Laboratory near Riesel, TX. Background and post-treatment data on water quality, soil quality, management practices, and economics have been collected on ten small watersheds managed as typical farm and ranch fields. In 2001, each watershed began receiving annual poultry litter application at a rate of 0-6 ton/ac.



Figure 1: Application of Poultry Litter at Riesel

Soil P

After seven years of litter application, soil phosphorus (P) levels increased on all of the sites receiving litter (Fig. 2), but the increase was more dramatic for the higher application rates.

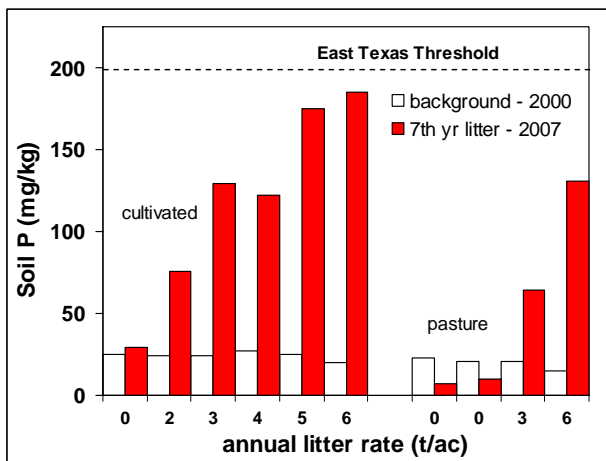


Figure 2: Soil Test P levels (Mehlich 3 test).

Water Quality

Similar to soil P, runoff P levels increased dramatically as litter rate increased (Fig. 3). After seven years, litter rates above 1-3 ton/ac produced runoff P concentrations greater than levels of concern.

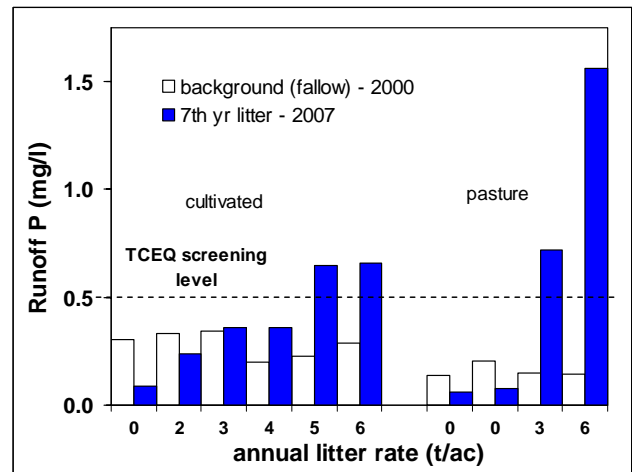


Figure 3: P Levels in Runoff.

Economics

Based on total budget and throughput (revenue minus costs of various fertilizer treatments) analysis, using poultry litter at 1-3 ton/ac per year plus supplemental N at recommended rates produced the best return per acre in six years of a corn-corn-wheat rotation. Litter rates from about 1.5-3 ton/ac (shaded area in Fig. 4) all had average annual profits of more than \$50 per acre.

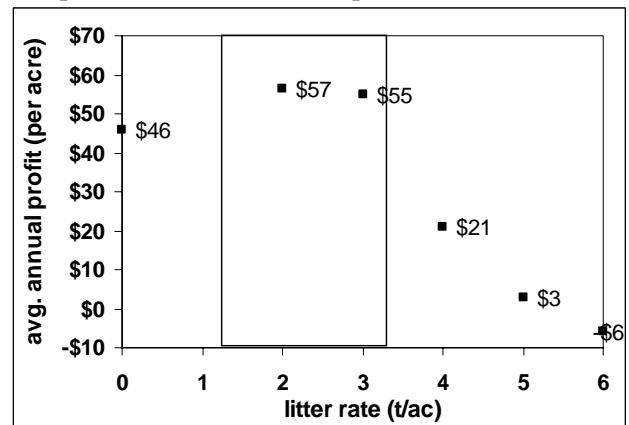


Figure 4: Profits for Various Annual Litter Rates

Both environmental and economic results demonstrate the importance of proper litter application rates. If excess litter is applied, P builds up in the soil and more P is lost in runoff. In addition, other pollutants will probably increase. This creates environmental problems and wastes money spent on buying and applying the litter. Proper litter rates also maximize profits, the goal in agricultural production.