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ECONOMIC VALUE OF POULTRY LITTER AS FERTILIZER FOR EAST TEXAS PASTURES

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Background. In recent years, poultry production in the United States has increased at the rate of 5% per year. Increase in per capita consumption has been the primary driving force. Per capita broiler consumption in the United States for 1973, 1983, and 1993 was 37, 50, and 78 lb, respectively. Rising broiler exports accounted for 9 percent of the US broiler production in 1993. Hong Kong, former USSR countries and Japan are the major importers. Broiler production in Texas increased 50% from 1986 to 1992.

Broiler houses are cleaned out every 12 to 24 months. Broiler litter is a mixture of poultry excreta, feathers, wasted feed and bedding material, which in East Texas, is usually pine wood shavings, sawdust, or rice hulls. Over 95 percent of the poultry litter produced in the United States is applied to agricultural land as fertilizer. Depending on the cost, poultry litter can be an economical alternative to commercial fertilizer for East Texas pastures.

Current Information. Nutrient content of poultry litter is quite variable. The average and range of six nutrients in samples from 147 poultry houses in Alabama is reported in Table 1. Variation is due to feed ration, number of batches of broilers since last clean out, type of waterers, and poultry house management. Poultry litter from houses equipped with straw waterers and with at least 4 to 5 batches of broilers since last clean out should be average or above in nutrient content. Manure from breeder or laying houses contains from 40 to 70% moisture compared to 20 to 25% moisture in broiler litter. Since one buys from 2 to 3 times as much water in manure from laying houses, there are fewer nutrients per ton.

Advantages of poultry litter over commercial fertilizer are 1) slower nitrogen (N) release which reduces nitrate leaching, 2) additional nutrients besides N, phosphorus (P) and potash (K), 3) contains calcium which decreases soil acidity, and 4) the added organic matter improves the water and nutrient holding capacity of the soil. About 20 to 25% of the N in poultry litter applied on the soil surface is lost through volatilization. From 60 to 65% of the N is available the first year and the remaining 10-15% is available after the first year. All the P and most of the K is available to plants. The value of a ton of poultry litter is calculated in Table 2 using the average nutrient content, estimated first year availabilities, and spring 1995 fertilizer prices. However, bermudagrass and bahiagrass require N-P-K in a 4-1-3 ratio and therefore not all the P and K in poultry litter is used by the grass because of limited N. Although $25.82 worth of N, P and K

are in an average ton of poultry litter, only $17.34 worth can be utilized by grass.

Recommendations. Poultry litter applied to pastures should be sampled and analyzed for the major nutrients. From 2 to 4 tons/acre should be applied in April to bermudagrass and other warm-season perennial grasses. Additional N fertilizer can be applied during the warm-season grass growing period or to overseeded winter forages to utilize the excess P and K from the poultry litter. Because legumes do not require N, overseeded clovers could utilize the excess P and K without additional N fertilizer.

Table 1. Average and range of nutrients in 147 poultry litter samples (80% dry matter basis) in Alabama (Auburn Univ., Auburn, AL Circular ANR-580).

Nutrient	Average	Range
	lb/ton	
Nitrogen (N)	62	34-96
Phosphate (P_2O_5)	59	22-142
Potash (K_2O)	40	13-99
Calcium (Ca)	35	13-98
Magnesium (Mg)	8	3-34
Sulfur (S)	6	0.2-13

Table 2. Estimated 1995 fertilizer value of poultry litter based on average nutrient content, percent nutrient availability, and nutrient uptake by grass.

Nutrient	Amount	Available	Cost	Value
	lb/ton	lb/ton	$/lb	$/ton
Nitrogen (N)	62 (60%)	37	0.34	12.58
Phosphorus (P_2O_5)	59 (100%)	59	0.16	9.44
Potash (K_2O)	40 (100%)	40	0.13	5.20
				27.22
	4-1-3 Ratio for Bermuda, Bahia, etc.			
Nitrogen (N)		37	0.34	12.58
Phosphorus (P_2O_5)		9	0.16	1.44
Potash (K_2O)		27	0.13	3.51
				17.53