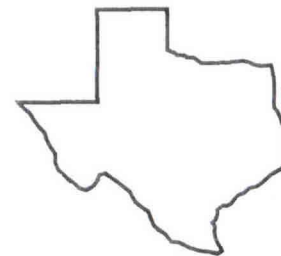
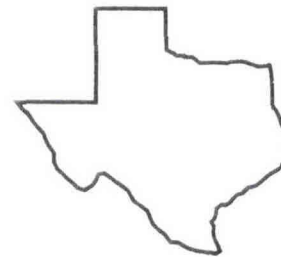
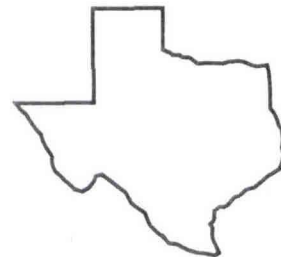
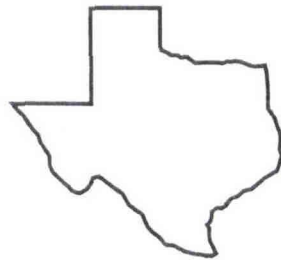
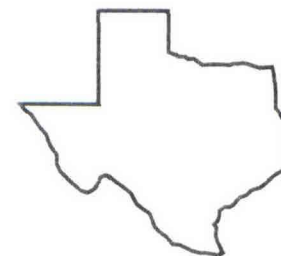


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## INFLUENCE OF APPLYING POULTRY LITTER ON SOIL PROPERTIES

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**Background.** Most of the poultry litter from broiler and laying houses is applied to pastures as fertilizer. Advantages of poultry litter are (1) it contains other plant nutrients besides nitrogen (N), phosphorus (P), and potassium (K), (2) the calcium (Ca) reduces soil acidity, and (3) the added organic matter improves the water and nutrient holding capacity of the soil. The main disadvantage is that the nutrient ratio in the poultry litter may be different from the nutrient ratio taken up by a particular crop.

Plant nutrient content and ratio in poultry litter will vary depending on poultry house management, time since last clean out, and how the poultry litter was handled and stored. A general N-P-K ratio is 4-2-3. When poultry litter is applied to the soil surface of a pasture, about 25-30% of N volatilizes and is lost which results in a ratio closer to 3-2-3. Bermudagrass takes up N, P, and K in a 3-1-2 ratio. It is assumed that about 65% of the K and 50% of the P is used by bermudagrass.

A study comparing 4 and 8 tons/acre of poultry litter was compared to 0, 100, 200 and 400 lb N/acre on 'Coastal' bermudagrass for 2 years at the Texas A&M University Agricultural Research and Extension Center at Overton. The poultry litter rates were applied in late spring or split into a late spring and mid-summer application. Phosphorus and K were added to the commercial N fertilizer treatments in a 3-1-2 ratio. Coastal bermudagrass production from this study is reported in another article in this publication. Soil samples from the top 6 in. were collected from each plot at the end of the second growing season and analyzed for plant nutrients, pH, and salt.

**Research Findings.** After 2 yr. the soil pH had dropped to 5.0 in the 400 lb N treatment, which is to be expected. Plots receiving poultry litter had a slightly higher pH than the N fertilizer treatments because of the calcium (Ca) in the litter. There were very low levels of nitrate ( $\text{NO}_3$ ) in all treatments because it moves through the soil if not taken up by plants. Concentrations of salt, phosphorus (P), potassium (K), and magnesium (Mg) were significantly higher in the poultry litter treatments than N fertilizer treatments. These data do support the concept that if poultry litter is the only fertilizer applied, P and K in excess of bermudagrass needs will accumulate in the soil. This is especially true of P when comparing N fertilizer, 4 tons poultry litter, and 8 tons poultry litter treatments.

**Application.** Poultry litter should be used in combination with additional N and K commercial fertilizer to utilize excess P.

Table 1. Soil pH, salt concentration, and mineral concentration in top 6 in. of soil after 2 years of poultry litter (PL) and commercial fertilizer application.

Treatment	pH	NO <sub>3</sub> %	Salt	P	K	Na	Ca	Mg
0 N	6.0 a <sup>1</sup>	1.0 c	52.5 d	3.5 d	81.8 c	20.8 a	558.5 a	48.0 b
100 N	5.8 a	1.5 abc	58.8 d	5.0 d	89.3 c	33.8 a	514.8 a	54.8 b
200 N	6.0 a	1.3 bc	55.0 d	4.3 d	89.8 c	28.5 a	500.8 a	46.8 b
400 N	5.0 b	1.0 c	56.3 d	7.8 d	97.5 c	41.3 a	381.8 a	36.8 b
4T PL	6.3 a	2.0 a	72.5 c	39.3 c	135.5 ab	34.0 a	648.3 a	77.5 a
2T + 2T PL	6.3 a	1.5 abc	73.8 bc	30.0 c	122.3 b	28.0 a	677.8 a	84.5 a
8 T PL	6.3 a	1.8 ab	83.8 ab	85.8 a	152.5 a	29.0 a	603.5 a	97.0 a
4T + 4T PL	6.2 a	1.5 abc	90.0 a	61.3 b	157.8 a	27.8 a	496.0 a	85.8 a

<sup>1</sup>Values within a column followed by the same letter are not significantly different at 0.05 level Waller-Duncan MRT.