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RESPONSE OF TIFTON 85 BERMUDAGRASS TO SOIL pH AND POULTRY LITTER IN 2004

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Background. Repeated application of high rates of poultry litter increases phosphorus (P) in soils. Soil P can be moved to water bodies as solution P and as P adsorbed on eroding soil particles. Increasing the level of P that is normally deficient in water can cause increased growth of algal blooms that, on decomposition, use much of the available oxygen in water and can cause suffocation and death of fish. Increasing rates of limestone (ECCE 100%) were reapplied to previous variable lime rate plots at similar rates in mid-July 2003 to expand the pH range in preparation for a study to evaluate the effect of soil acidity on fixation of P applied in poultry litter (PL). Tifton 85 bermudagrass was the warm-season evaluator forage. The 36-plot site was resampled from 0 - 6-in deep and analyzed for pH in late April, 2004. Each 12-plot tier in this new study became a replication with plots selected to provide a range of pH from low, through medium, to high in a randomized complete block design. Poultry litter, homogenized for each replication, was applied at rates equivalent to 2, 4, and 8 t/ac to randomly designated plots in each of the three pH ranges in each 12-plot replication on May 6, 2004. Three minus poultry litter check plots were included in each replication. Ammonium sulfate at 120 lb of nitrogen (N)/ac/forage harvest and muriate of potash at 100 lb of potassium (K)/ac were applied to all plots. **Research Findings.** Dry matter (DM) production was lower in the earlier two harvests compared to harvests taken later (Table 1). At the high pH range, an additional ton of DM was produced at the third harvest compared to the second harvest over a comparable growing time. Yields of Tifton 85 were increased as pH range increased. At the high pH range, 1.3 t/ac additional bermudagrass DM was produced compared to yield at the low pH range. Increasing the PL rate at constant rates of fertilizer N and K significantly increased Tifton 85 bermudagrass DM yield. Two tons of poultry litter significantly increased DM yield compared to the untreated check plot, and 8 tons of poultry litter significantly increased DM yield compared to the 2 or 4 ton/ac rate of poultry litter. A significant interaction of pH range and poultry litter rate occurred relative to Tifton 85 DM production (Fig. 1). Response of Tifton 85 to pH was linear, whereas response to applied poultry litter was quadratic.

Application. Tifton 85 bermudagrass responds differently to limestone than does Coastal bermudagrass that is more tolerant to soil acidity. Farmers and ranchers on acid soils who are planning to grow, or are growing, Tifton 85 bermudagrass need to ensure that their soils are well limed so that optimum DM production can be obtained from this grass. The response of

Tifton 85 to increasing rates of poultry litter is another indication that bermudagrass needs high rates of fertility for optimum production.

Table 1. Tifton 85 bermudagrass yield response to pH range (limestone) and poultry litter (PL).

	Dry matter yield by harvest date and total† (2004)					
pH range	June 7	June 25	July 16	Aug. 30	Oct. 12	Total
	lb/acre					
Low	779 b	924	2,324 c	3,443 c	2,325 b	9,795 c
Medium	948 a	999	2,823 b	3,974 b	2,519 b	11,263 b
High	1,021 a	1,007	3,145 a	4,332 a	2,872 a	12,376 a
Poultry litter, t/ac						
0	653 b	838 b	2,654	3,470 c	2,142 c	9,756 c
2	885 a	923 b	2,807	3,851 b	2,446 b	10,913 b
4	1,013 a	1,057 a	2,702	3,968 b	2,706 b	11,446 b
8	1,113 a	1,089 a	2,892	4,377 a	2,993 a	12,464 a
R^2	0.71	0.60	0.72	0.82	0.81	0.85
c.v.	21.2	13.5	12.4	8.4	10.4	7.6

†Values in a column/group followed by a similar letter are not significantly different statistically ($\alpha = 0.05$).

Yield = 801 + (1398.6 x pH) + (609 x PL) - (33.7 x PL x PL)
R = 0.866

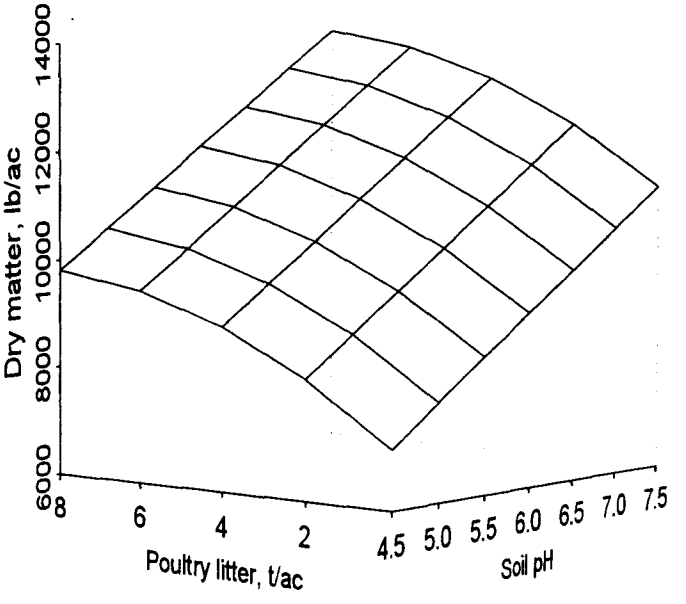

Fig 1. Tifton 85 bermudagrass response to soil pH and poultry litter rate on Darco soil in 2004.

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