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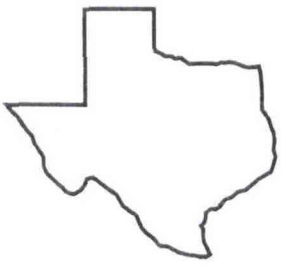
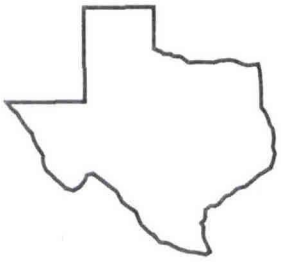
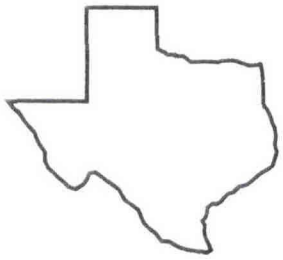
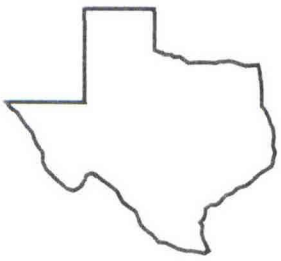




Overton Field Day Report - 1994





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COASTAL BERMUDAGRASS RESPONSE TO LIMESTONE RATES AND ECCE

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Background. The soils of East Texas are weathered from high rainfall that causes nutrient leaching. Fertilization of crop and pasture lands with nitrogen creates soil acidity. Coastal bermudagrass can be quite tolerant to acidity, surviving in mine spoil soils with a pH of 3.4. Research was conducted to evaluate limestone rates and differing effective calcium carbonate equivalence (ECCE) percentages on crop growth. The term ECCE refers to the neutralizing efficiency of limestone. Finer limestone has a higher percentage ECCE than a coarser material.

Research Findings. Treatments of 0, 1, 2, and 3 ton/ac of calcitic (calcium carbonate) limestone in all possible combinations with ECCE levels rated at 62, 81, and 100% were applied in October 1989. Three Coastal bermudagrass-based forage systems were used in this research: (1) bermudagrass only; (2) bermudagrass-annual ryegrass; and (3) bermudagrass-annual clovers. Research was conducted on two different soil series. The Darco series is a loamy sand extending to a depth of at least 4 feet over a clay subsoil. The Kirvin series has a fine sandy loam surface 6-inches deep, underlaid by a red, gravelly, sandy clay loam subsoil. Adequate levels of all fertilizer nutrients were applied as required. This report covers only bermudagrass that was harvested at approximately 4- to 6-week intervals during the growing season.

No bermudagrass dry matter yield differences were measured due to lime rates or lime ECCE from the Kirvin soil for the 1990 through 1992 growing seasons or the 1990 season on the Darco soil (data not presented). The third cutting of 1991 showed a yield response to limestone with the 1, 2, and 3 ton/ac rates yielding higher than the 0 rate (data not presented). This yield increase was small and was not significant in the seasonal total. No differences in bermudagrass yields due to varying ECCE percentages were measured.

The 1992 Coastal bermudagrass yields on the Darco soil responded to applied lime through each of the 3 cuttings and the seasonal total. Cutting 1 showed a 383 lb/ac increase from the 2 ton/ac lime rate over the 0 lime plots. In cutting 2, a 921 lb/ac increase was measured from plots receiving the 3 ton/ac lime rate over the lime check. In cutting 3, an extra 687 lb/ac was produced by the high lime rate over that of the lime check. These results were reflected in the 1992 seasonal total which showed a linear increase in dry matter yield from 7310 lb/ac in the zero lime check plots to 9275 lb/ac for the 3 ton/ac lime rate. This represents almost a ton per acre increase in dry matter production due to the application of limestone. No response to lime ECCE

percentage was measured.

The 1993 Coastal bermudagrass yield differences began similarly to the 1992 yields. Cutting 1 showed a 1207 lb/ac increase from the 3 ton/ac lime rate over the check. Cuttings 2 and 3 resulted in no differences between lime rates due to the drought conditions during July through September. The 1993 seasonal total yield showed a linear increase with an approximate three-quarters of a ton/ac advantage in bermudagrass production at the 3 ton/ac rate over the check. No response to increasing lime ECCE percentage was measured.

Application. The response of Coastal bermudagrass to the application of limestone produced varied results. The response for the Kirvin soil which has been under pasture and hay production for several years was negligible. However, the response on the Darco soil was measured 4 years after being cleared of timber and sprigged to Coastal bermudagrass. No definite pH level has been defined below which application of lime will result in a positive yield response of Coastal bermudagrass. These data and a review of the literature indicate that pH 5.6 may be the critical level. Keeping the soil pH above 5.6 would also help maintain nutrient use efficiency. This would seem especially true in the low cation exchange capacity, deep, sandy soils. Although lime source did not have an effect on bermudagrass yields, the finer limestones (ECCE greater than 62%) raised pH higher and maintained it longer than the ECCE 62 lime over a four-year period.

Acknowledgement. Appreciation for partial funding is extended to Texas Crushed Stone Company, Texas-Louisiana AgLime and Fertilizer Association, and Texas Plant Food Institute.

Table 1. Response of Coastal bermudagrass to limestone rates, Darco site (lb dry matter/ac).

Lime rate	1992				1993			
(ton/ac)	Cut 1	Cut 2	Cut 3	Total	Cut 1	Cut 2	Cut 3	Total
0	1610 B[1]	2793 B[1]	2907 B[2]	7310 B[2]	2527 B[1]	1459[N.S.]	1452[N.S.]	5438 B[1]
1	1888 A	3442 A	3376 A	8706 A	3184 A	1462	1474	6120 AB
2	1993 A	3598 A	3404 A	8995 A	3360 A	1457	1365	6182 AB
3	1967 A	3714 A	3594 A	9275 A	3734 A	1652	1461	6847 A

[1]Means within a column not followed by the same letter are significantly different according to the SNK multiple range test (P = 0.05).

[2]Means are different at the P = 0.10 level.