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COASTAL BERMUDAGRASS AND LEGUME RESPONSE TO LIMESTONE RATE, LIMESTONE FINENESS (ECCE) AND BORON

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Background. Boron treatment of soils for clover growth in field and greenhouse experiments has consistently increased dry matter yields. This study, begun in fall 1988, investigates the effect of increasing limestone fineness on reactivity in the soil and effects on clover response to boron.

Research Findings. Limestone rates were 0, 1, and 2 tons/ac applied at ECCE ratings of 62 and 100%. Limestone treatments were applied in spring of 1988 and 1991 and were left on the soil surface. Boron treatments of 0, 1, and 2 lb/ac have been applied annually in fall for clover production. 'Alfagraze' alfalfa was overseeded into the 'Coastal' bermudagrass stand in 27-inch row spacings in fall of 1991. Also, two rows of 'Tibbee' crimson clover were interseeded at 9-inch row spacings between the alfalfa rows. A crimson clover harvest that included some alfalfa was made in spring 1992. Soil samples to the 6-inch depth were collected in June 1992.

Increasing the limestone ECCE from 62 to 100% increased soil pH from 5.9 to 6.3 and from 6.3 to 6.7 at the 1 and 2 ton/ac lime rates, respectively (Table 1). Examination of the pH data revealed that the 1 ton/ac rate of ECCE 100 limestone applied in 1988 and 1991 raised soil pH to 6.3. To achieve the same pH 6.3 by use of ECCE 62 limestone required the 2 ton/ac limestone rate applied twice.

Legume and bermudagrass yields were increased by limestone application. One ton of limestone/ac applied twice in four years was sufficient to increase yield of the legumes. Additional limestone caused a slight, though not statistically significant, yield increase. Two tons of ECCE 62 limestone applied twice were required to increase yield of bermudagrass dry matter. A similar increase in bermudagrass yield was obtained with ECCE 100 limestone applied at only 1 ton/ac twice in the 4 year study.

Only one cutting of Tibbee crimson clover-alfalfa was obtained in 1992. One lb B/ac increased legume yield significantly. Response of the legumes to the interaction of limestone ECCE and B was statistically significant in 1992. The legume response followed a trend that produced statistically significant yield differences in a previous year. That is, legume yield declined at the 2 lb/ac B rate when ECCE 62% limestone was applied. Yield of legumes continued to increase at the 2 lb/ac B rate when the limestone source was ECCE 100%.

After the first cutting of crimson clover, regrowth was sparse in plots that were adequately

limed and treated with B. However, there was no regrowth of the clover or alfalfa in plots that had not received B for four years, regardless of the limestone rate or ECCE level.

Application. Results after four years of B and limestone treatment show that ECCE 100 limestone is more efficient at increasing soil pH and yields of Coastal bermudagrass. Since the 1 ton/ac rate applied twice produced the same pH and yield of bermudagrass as the 2 ton/ac rate applied twice, it can be concluded that ECCE 100 limestone is twice as efficient as ECCE 62 limestone. The lack of regrowth of clover in the zero B plots following the first cutting indicates that a severe deficiency of this nutrient has occurred in this Darco soil after four years of cropping. A soil test for B should be requested with the standard battery of tests made on acid, sandy soils when a legume crop is to be planted.

Table 1. Effect of limestone rate, ECCE, and boron on soil pH and crimson clover-alfalfa and Coastal bermudagrass dry matter yields four years after initial limestone treatment.

Limestone		A					
1988	1991	ECCE 62 Limestone			ECCE 100 Limestone		
-----ton/ac-----		pH	Legume -----lb/ac-----	Grass	pH	Legume -----lb/ac-----	Grass
0	0	5.7	617 b	5880 b	5.7	617 b	5880 b
1	1	5.9	1106 a	5955 b	6.3	1255 a	6497 a
2	2	6.3	1238 a	6478 a	6.7	1462 a	6179 ab

Boron		B			
rate		Limestone ECCE 62		Limestone ECCE 100	
lb/ac		Legume -----lb/ac-----	Grass	Legume -----lb/ac-----	Grass
0		550 b	6013 ab	685 b	6108 N.S.
1		1228 a	6421 a	1240 a	6177
2		1183 a	5879 b	1409 a	6272