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ALFALFA INTERSEEDED INTO COASTAL BERMUDAGRASS
II. EFFECT OF NITROGEN RATES

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Background. Alfalfa has the highest livestock feeding value of all commonly grown hay crops, producing more protein per area than any other. Alfalfa thrives on well-drained soils with near neutral pH levels. If alfalfa is properly inoculated, it requires no supplemental nitrogen fertilization. Hybrid bermudagrasses are widely grown in the South for both grazing and hay production. Coastal bermudagrass tolerates some soil acidity but requires high rates of nitrogen fertility for economic production. In this study, alfalfa was interseeded in rows into a Coastal bermudagrass sod. Objectives were to determine if both crops could be managed together, evaluate change of forage quality, and estimate the nitrogen requirements of bermudagrass when grown with alfalfa.

Research Findings. A Darco loamy sand established to Coastal bermudagrass was limed to achieve a pH of 6.7 to 6.9. The limestone was roto-till incorporated into the Coastal sod before initiation of spring growth. The following fall the bermudagrass was harvested at a 2-inch height and 'Alfagraze' alfalfa was drilled in rows spaced 9, 18, 27, and 36 inches apart. The seeding rate was 20, 10, 6.6, and 5 lb of seed per acre for the 9- through 36-inch row spacings, respectively. A fertilizer blend containing 0-20-23 as N, P_2O_5, and K_2O, and 3% magnesium, 6% sulfur, .16% boron, 1% copper, and 1% zinc was applied in late winter and mid-summer. Nitrogen rates of 0, 25, 50, 75, and 100 lb/ac were applied across row spacings following each forage harvest for total applications of 0, 150, 300, 450, and 600 lb of N/ac/year. The alfalfa and bermudagrass components of the forage were hand-separated and oven-dried for calculation of dry matter yield. This report includes 1992 data.

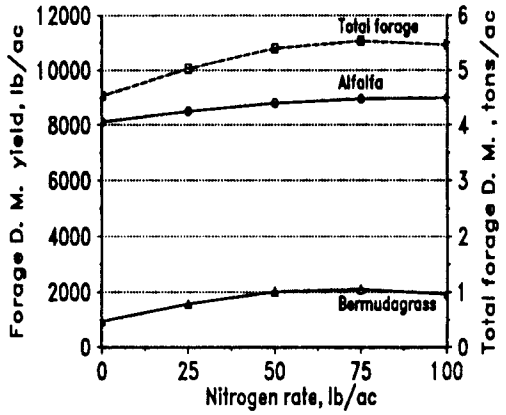

Fig. 1. Effect of nitrogen rate on Alfagraze alfalfa and Coastal bermudagrass dry matter yield.

In 1992, 6 harvests were taken beginning April 3 and ending September 15. Data show that alfalfa yield increased slightly as N rate increased (Fig. 1.) Bermudagrass increased significantly for N rates above 25 lb/ac/cutting. Total forage dry matter was increased significantly with all levels of applied N over the zero N

check (right Y-axis, Fig. 1.) Alfalfa yields were similar for the first three cuttings and declined for the last three (Fig. 2.) Alfalfa yields were increased significantly by increasing N rates at harvests made on May 4, Aug. 11, and Sept. 15. Bermudagrass yields ranged from 1% to 60% of the alfalfa yields (Fig. 3). Bermudagrass had not initiated growth when the first harvest of alfalfa was taken on April 3. Bermudagrass yields were increased significantly by N rates on the same harvest dates as alfalfa. This may have been a response to rainfall and stored soil water.

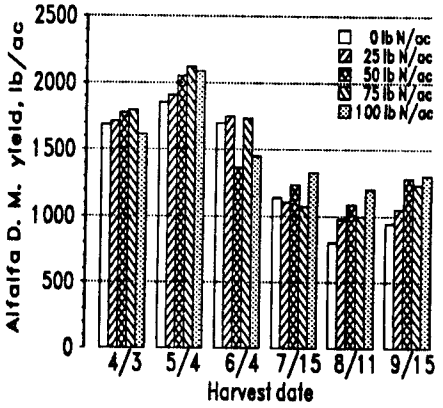

Fig. 2. Response of alfalfa interseeded into Coastal bermudagrass to N rate and harvest date.

Application. Results from the second year of this study demonstrate alfalfa's competitativeness with Coastal bermudagrass in a mixed planting. Legumes such as alfalfa are able to grow successfully without added N fertilizer if properly inoculated. Alfalfa yields from this study support this fact. Alfalfa, interseeded into bermudagrass, could supply a portion of the N that the grass needs for optimum growth. After alfalfa reaches a mature growth stage, older surface feeding roots die. These roots have the potential of adding N to the soil through mineralization. Mineralized N could be used by grass growing in a mixed sward.

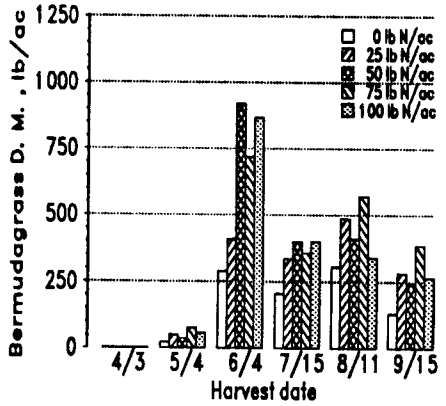

Fig. 3. Coastal bermudagrass response to N rates and harvest dates in interseeded alfalfa.

The bermudagrass yields for this study were low compared to the alfalfa. Although both forages are deep rooting, alfalfa appears to have tolerated the drought conditions of the summer better than the Coastal bermudagrass. After a two year evaluation of this system, alfalfa interseeded into Coastal bermudagrass promises to be a viable cropping system for the East Texas area. During this dry year, 50 lb of N/ac per cutting produced optimum bermudagrass yields, but the cost of this N may not be economical for the additional ton of bermudagrass dry matter produced/ac.

Research is being initiated to evaluate alfalfa response to varying lime rates, boron, phosphorus, potassium, magnesium, and sulfur, with growth response on varied soil types.