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Effect of Fluid Fertilization on Coastal Bermudagrass

II. Method of Application of Urea-Ammonium Nitrate

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Summary

Urea-ammonium nitrate (UAN) was spray broadcast, surface dribble banded at 14-inch band spacings, or subsurface dribble banded at 14-inch band spacings onto 10 × 20-foot plots. Rates of nitrogen were 40, 80, and 120 lb/A applied prior to each growth of grass. Data from both 1984 and 1985 indicated that dry matter yield was equal for all application methods. Nitrogen rates significantly increased dry matter yield on the Sawtown and Gallime fine sandy loam soils both years.

Introduction

Urea-ammonium nitrate (UAN) is normally most efficiently applied as a band application to most crops on the majority of soils. Broadcast spray application to the soil surface without incorporation is usually the least efficient method of application. On some perennial forage crops such as Coastal bermudagrass, it is not possible to incorporate spray broadcast N. This experiment was designed to evaluate the effect of spray broadcast, surface, and subsurface banded applications of UAN on Coastal bermudagrass yield and quality.

Procedure

Fluid UAN at rates of 40, 80, and 120 lb/A was spray broadcast, dribble banded on the surface at 14-inch band spacings, or dribble banded subsurface at the 14-inch band spacing on Coastal bermudagrass prior to each new growth of grass. Three N applications and harvests were made in 1984 and four in 1985. The N rates and band spacings were applied in a randomized complete block design. All treatments were replicated three times at each of two research locations. The soils were Gallime and Sawtown fine sandy loams. Initially, all plots received 100 lb P₂O₅ and 160 lb of K₂O/A, followed by 200 lb K₂O/A in early October 1984. In mid-April 1985, 200 lb K₂O and 100 lb P₂O₅/A were applied to all plots. Harvests were made by cutting a swath 4.92 × 18 feet through the middle of each plot. A dry matter sample was collected from each plot for moisture and chemical analysis.

Results and Discussion

Total yields for 1984 and 1985 at both soil sites, and the sum of the 1984 and 1985 yields indicated that methods of application had no effect on Coastal bermudagrass production (Table 1). This appears to be contrary to published data, but may be due to the acidity level of these soils. Both soils have a pH near 5.0, and at this acidity level there may be less loss of N due to ammonia volatilization.

Attempts to dribble band the UAN below the soil surface were relatively ineffective due to the dense sod and root system of the Coastal bermudagrass growing in

these sandy loam soils. The coulters cut about 2 inches deep but could not be forced deeper with the present weight of the applicator. An additional 150 lb per coulters would be needed to force the coulters to cut into the sod deep enough to place the UAN below the soil surface.

The subsurface attempts at dribble banding sometimes placed the UAN just below the soil surface, but most of this treatment was mixed with the loose soil exposed by the coulters and back-swept applicator knife. This placed most of the fluid in direct contact with soil moisture and could cause more rapid hydrolysis and possibly NH₃ volatilization of the urea component of the UAN.

Increasing the N rate to 120 lb/A significantly increased grass yields on the Sawtown soil in both years, and on the Gallime soil only in 1984. Methods of application at individual nitrogen rates were also not statistically different.

TABLE 1. RESPONSE OF COASTAL BERMUDAGRASS TO UAN APPLIED AT NITROGEN RATES OF 40, 80, and 120 LB/A AS SPRAY BROADCAST, SURFACE DRIBBLE, AND SUBSURFACE DRIBBLE BANDS

Application method	Dry Matter Yield ¹			
	Sawtown Soil		Gallime Soil	
	1984	1985	1984	1985
	Tons/A			
Spray broadcast	4.2 a	5.8 a	5.9 a	8.1 a
Surf. dribble band	4.0 a	5.4 a	6.3 a	8.8 a
Sub-surf. dribble band	4.0 a	5.6 a	6.0 a	8.3 a
Nitrogen Rates				
lb/A				
40	3.6 a	4.2 a	4.6 a	6.8 a
80	4.0 a	5.8 b	6.4 b	8.8 b
120	4.6 b	6.9 c	7.1 c	8.6 b

¹Dry matter yields within individual sets of data by site, year, method of application, or nitrogen rate, followed by the same letter are not significantly different, statistically, at p < .05 level of probability.

KEYWORDS: Urea-ammonium nitrate/spray broadcast/coastal bermudagrass.