Effect of Fluid Fertilization on Coastal Bermudagrass. I. Spacing Between Dribble Bands of Urea-Ammonium Nitrate

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Summary

Urea-ammonium nitrate (UAN), a 32 percent nitrogen (N) solution, was dribble banded on 10- X 20-ft plots of Coastal bermudagrass at spacings of 7, 14, 21, and 28 inches between bands. Rates of applied N were 40, 80, and 120 lbs/A prior to each flush of growth. Data from individual years indicate that dry matter yields were equal for all dribble band spacings. Initially, the grass contacted by the fluid N turns yellow. New growth in the band area turns dark green, leaving the between band spaces with a N deficient pale green appearance. Nitrogen deficiencies between bands had disappeared from actively growing grass within 3 weeks. Streaks were evident at harvest in the widest band treatments when grass growth was limited due to drought.

Introduction

Although the fluid fertilizer market is expanding nationwide, the use of these fertilizers is almost negligible on Coastal bermudagrass in the East Texas Timberlands. Fluids offer alternative fertilizer sources to the standard solid materials presently dominating the forage market.

KEYWORDS: Urea-ammonium nitrate/Coastal bermudagrass/fluid fertilizers/dribble banded.

Apparently, fluids were tried as broadcast spray applications in the early 1960s, and fear of excessive loss of N by the spray broadcast application method turned the producer away from use of these fertilizers. Data in this report are an evaluation of dribble banding fluid urea-ammonium nitrate (32 percent N) for Coastal bermudagrass production.

Procedure

Fluid urea-ammonium nitrate (UAN, 32-0-0) was applied to Coastal bermudagrass. Nitrogen rates of 40, 80, and 120 lbs N/A were dribble banded at spacings of 7, 14, 21, and 28 inches prior to each flush of grass growth. Three N applications and harvests were made in 1984, four in 1985, and five in 1986. Treatments were applied in a randomized complete block experimental design. Three replications of each treatment were applied at two research locations. One was on a Gallime fine sandy loam (fine-loamy, siliceous, thermic Glossic Paleudalf). The other was on a Lilbert loamy fine sand (loamy, siliceous, thermic Arenic Plinthic Paleudult). Initially, all plots received 100 lbs P_2O_5 and 160 lbs of K_2O/A, followed by 200 lbs K_2O/A in early October 1984. In mid-April 1985, 200 lbs K_2O and 100 lbs P_2O_5/A were applied to all plots. In January 1986, 200 lbs K_2O/A was applied. This same rate of K_2O was applied along with 100 lbs P_2O_5/A in early April. Harvests were made by cutting 4.9 ft from the middle of each plot with a harvested plot length of about 18 ft. A dry matter sample was collected from each plot for moisture and chemical analysis.

Results and Discussion

Response of Coastal bermudagrass to dribble band spacings of UAN on both soils is presented in Table 1. Total yields each year indicate no differences due to distances of

TABLE 1. RESPONSE OF COASTAL BERMUDAGRASS TO DRIBBLE BANDED RATES OF NITROGEN AS UAN APPLIED AT FOUR BAND SPACINGS AND THREE NITROGEN RATES ON LILBERT AND GALLIME SANDY ACID SOILS

Band Spacing	Dry Matter Yields[1]					
	Lilbert Soil			Gallime Soil		
	1984	1985	1986	1984	1985	1986
	Tons/Acre					
7	4.2a	5.4a	6.8a	6.6a	8.2a	7.6a
14	4.2a	6.0a	7.0a	6.6a	8.0a	7.2a
21	3.8a	5.3a	6.7a	6.6a	8.0a	7.6a
28	4.0a	5.5a	6.8a	6.7a	8.0a	7.0a
Nitrogen Rates						
lbs/A						
40	3.4a	4.4a	6.1a	5.5a	6.7a	6.8a
80	4.2b	5.7b	7.0b	7.0b	8.4b	7.6b
120	4.5b	6.5c	7.3b	7.4c	9.0b	7.7b

[1]Yields within data sets for band spacings or N rates by year and soil when followed by the same letter are not significantly different at $p<0.05$ by Newman-Keuls mean comparisons.

7 to 28 inches between dribble bands. This was evident even at the individual rates of N on both sites.

Coastal bermudagrass rhizomes are abundant in surface soils. These rhizomes compete vigorously for moisture and nutrients, producing a profusion of stolons which are capable of rooting at nodes. The rooting ability of the Coastal bermudagrass stolons apparently allows roots to grow into the fertilized bands. The band-applied N can then be translocated to stolons growing between fertilizer bands.

Streaking was observed within a day following application, regardless of the band spacing. This occurred first as a yellowing of existing vegetation that was contacted by the UAN. New, dark green grass growth later defined the band and a pale green nitrogen deficiency existed between bands. The grass outgrew this deficiency. The narrower the band spacing, the faster this occurred, until even the 28-inch band spaces were grown-over 3 and 4 weeks following fertilizer application when the grass was growing vigorously. The unfertilized N deficient streaks between bands remained until harvest when the grass was not growing vigorously due to a stress condition.

Nitrogen rates, averaged over all band spacings, indicated that Coastal bermudagrass continued to increase significantly up to the 80 and 120 lbs/A levels, though not significantly at the 120 lbs/A rate in all cases. The Gallime soil was much more responsive to fertilizer treatment than was the Lilbert soil.

Band spacings at individual nitrogen rates had no effect on dry matter yield at either site in any year of this study.