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# Effect of Fluid Fertilization on Coastal Bermudagrass
# III. Nitrogen Source Comparisons

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## Summary

Nitrogen source comparisons were conducted on Sawtown and Gallime fine sandy loam soils in 1984 and 1985. Nitrogen rates of 0, 40, 80, and 120 lb/A were applied prior to each new growth of grass. These treatments were applied and harvests were made three times in 1984 and four times in 1985. Nitrogen sources were urea, ammonium nitrate, ammonium sulfate, urea with calcium added, and urea-ammonium nitrate (UAN) with and without combinations of sulfur or boron at rates of 16 or 0.4 lb/A, respectively, each application. On the lower production Sawtown soil, all N sources and combinations produced equal dry matter yields both years. On the Gallime soil in 1984, UAN with ammonium sulfate added compared favorably with ammonium nitrate and ammonium sulfate for dry matter production. Other nitrogen sources and nutrient combinations produced equivalent yields of grass. Urea and UAN produced equivalent yields, but ammonium nitrate produced significantly more grass than either of them when averaged over all N rates. A significant yield increase occurred between 80 and 120 lb N/A at both sites and in both years.


## Introduction

There is a continual controversy over which N source is the best for various crops and climatic conditions. This report contains results of comparisons of the more common N fertilizers applied to plots treated with phosphorus (P), potassium (K), zinc (Zn), and molybdenum (Mo). These N fertilizers were UAN, urea, ammonium nitrate, ammonium sulfate and combinations of urea with calcium, UAN with sulfur (S) from ammonium thiosulfate or from ammonium sulfate, UAN with boron (B), and UAN without Zn and Mo.

Results of this study should help producers decide which N source might work best for their system of Coastal bermudagrass hay production.

## Procedure

Nitrogen source treatments included urea-ammonium nitrate (UAN), applied to plots treated with 4.5 lb of zinc (Zn) and 46 grams of molybdenum (Mo)/A, UAN without Zn and Mo, UAN with 16 lb sulfur(S)/A supplied as ammonium thiosulfate, UAN with 16 lb S/A supplied as ammonium sulfate, UAN with 0.4 lb boron, urea with calcium chloride added at the ratio of 1:.34 equivalents N:Ca, urea, ammonium nitrate, ammonium sulfate, and a zero N check. These N sources were applied to 10 × 20-foot plots which were treated with 100 lb $P_2O_5$ and 160 lb $K_2O$/A in spring 1984 followed by application of 200 lb $K_2O$/A in October 1984, and 100 lb $P_2O_5$ and 200 lb $K_2O$/A in April 1985.

A 4.9 × 18-foot swath was harvested through the length of each plot and was weighed. A dry matter sample was collected from each plot for moisture and chemical analysis. Yield data were analyzed statistically by MSUSTAT for analysis of variance and Newman-Keuls mean comparisons.

**TABLE 1. RESPONSE OF COASTAL BERMUDAGRASS TO NITROGEN SOURCES AND SOURCE COMBINATIONS WITH CALCIUM, SULFUR, AND BORON, AND TO NITROGEN RATES AVERAGED OVER ALL SOURCES**

| | Dry Matter Yield[1] | | | |
|---|---|---|---|---|
| | Sawtown Soil | | Gallime Soil | |
| Nitrogen Sources | 1984 | 1985 | 1984 | 1985 |
| | Tons/Acre | | | |
| UAN with Zn and Mo | 3.6 a | 5.2 a | 5.2 ab | 6.5 abc |
| UAN without Zn and Mo | 3.8 a | 5.1 a | 5.2 ab | 6.3 ab |
| UAN plus 16 lb S (ATS) | 3.5 a | 4.9 a | 5.2 abc | 6.2 a |
| UAN plus 16 lb S (AMS) | 3.5 a | 5.4 a | 5.5 bcd | 6.5 abc |
| Urea-N plus Ca (1:.34) | 3.6 a | 4.9 a | 5.3 abc | 6.3 ab |
| UAN plus 0.4 lb B/A | 4.0 a | 4.8 a | 5.1 a | 6.2 a |
| Urea | 3.6 a | 4.7 a | 5.3 abc | 6.4 abc |
| Ammonium Nitrate | 3.9 a | 5.1 a | 5.8 d | 7.2 c |
| Ammonium Sulfate | 3.8 a | 5.7 a | 5.5 cd | 7.0 bc |
| Nitrogen Rate, lb/A[2] | | | | |
| 0 | 1.6 a | 2.6 a | 1.8 a | 2.6 a |
| 40 | 3.6 b | 4.8 b | 5.0 b | 6.2 b |
| 80 | 4.6 c | 6.0 c | 6.9 c | 8.3 c |
| 20 | 5.0 d | 7.0 d | 7.6 d | 9.0 d |

[1]Dry matter yields within an individual year and site, by nitrogen source or by nitrogen rate, followed by a similar letter are not significantly different at $p<.05$ level of probability.

[2]Individual nitrogen rates with added S, Ca, or B were applied prior to each new growth of grass.

KEYWORDS: Nitrogen/Coastal bermudagrass/nitrogen sources/Sawtown and Gallime fine sandy loam soils.

## Results and Discussion

Nitrogen sources and combinations of UAN with S and B, and urea with Ca, averaged over all N rates, were equally effective for grass production on the Sawtown soil through three harvests in 1984 and four harvests in 1985 (Table 1). This was a low production site. The coefficient of variation over this site indicated that site variation may have caused the poor resolution of differences among N sources.

Nitrogen source comparisons on the Gallime soil indicated that UAN plus ammonium thiosulfate, ammonium nitrate, and ammonium sulfate all produced similar dry matter yields in 1984. Ammonium nitrate produced equal yields compared to ammonium sulfate and both treatments were better than UAN. Sulfur and boron mixed with UAN had no significant effect on yield. The 1985 total dry matter production indicated that UAN, UAN plus S from ammonium sulfate, urea, ammonium nitrate, and ammonium sulfate all produced equal dry matter yields.

Interaction of N sources by N rates on dry matter yields in 1985 indicated that at the 40 and 80 lb N/A rates, ammonium nitrate and ammonium sulfate increased dry matter yields to a similar extent, and produced significantly more dry matter than any of the other N sources (data not shown). When the N rate was increased to 120 lb/A, all N sources increased yields to the same extent, indicating that the 120 lb/A rate provided adequate N even with any losses which may have occurred.

Nitrogen rates averaged over all N sources and combinations indicated that yields were increased significantly at both sites by increasing rates of N up to and including the 120 lb/A rate in both years.