

# **EFFECTS OF DAIRY MANURE COMPOST APPLICATION TIMING AND RATE ON COASTAL BERMUDAGRASS**

**Erath County, Texas**

## **INTRODUCTION**

Dairy manure compost is a good source of nutrients for vegetation especially when supplemented with commercial nitrogen fertilizer. The level of nitrogen supplementation required can vary based on the forage producer's yields and goals for overall quality. By determining the best possible dairy manure compost and nitrogen fertilizer rates and timings, better recommendations can be made to those utilizing the compost on their property. Research was conducted to compare the effects of composted dairy manure and raw dairy manure alone, or in combination with supplemental inorganic fertilizer on soil chemical properties, and Coastal bermudagrass yield and quality.

## **OBJECTIVE**

The primary objective of this demonstration was to determine the effects of compost application timing and rate on yield of coastal Bermudagrass.

## **MATERIALS AND METHODS**

This study was conducted at the Stephenville Research and Demonstration Center in Erath County which consists of a May fine sandy loam with a 0 to 1 percent slope.

The study consisted of 27 treatments that included three compost rates applied at three different times and supplemented with 0, 50, and 100 lbs/acre of a commercial nitrogen fertilizer (Figure 1.) The dairy manure compost was hand applied on November 20, 2002, January 22, 2003, and March 10, 2003. The commercial fertilizer applications were also made of March 10, 2003.

Plots were harvested by cutting a 4.33 foot strip from the center of each plot with an Almaco forage harvester. A grab sample was also taken to determine the moisture content and forage quality of the bermudagrass.

**Table 1:** Displays the application timing, compost rate, and fertilizer rate applied to each treatment.

<b>Treatment Number</b>	<b>Application Timing</b>	<b>Compost Rate ton/A</b>	<b>Rate of Fertilizer per cutting lb/A</b>
1	Nov 20, 2002	8	0-0-0
2	Nov 20, 2002	8	100-0-0
3	Nov 20, 2002	16	0-0-0
4	Nov 20, 2002	16	100-0-0
5	Nov 20, 2002	32	0-0-0
6	Nov 20, 2002	32	100-0-0
7	Jan 22, 2003	8	0-0-0
8	Jan 22, 2003	8	50-0-0
9	Jan 22, 2003	8	100-0-0
10	Jan 22, 2003	16	0-0-0
11	Jan 22, 2003	16	50-0-0
12	Jan 22, 2003	16	100-0-0
13	Jan 22, 2003	32	0-0-0
14	Jan 22, 2003	32	50-0-0
15	Jan 22, 2003	32	100-0-0
16	Mar 10, 2003	8	0-0-0
17	Mar 10, 2003	8	50-0-0
18	Mar 10, 2003	8	100-0-0
19	Mar 10, 2003	16	0-0-0
20	Mar 10, 2003	16	50-0-0
21	Mar 10, 2003	16	100-0-0
22	Mar 10, 2003	32	0-0-0
23	Mar 10, 2003	32	50-0-0
24	Mar 10, 2003	32	100-0-0
25	Untreated Check	0	0-0-0
26	Control	0	100-0-0
27	Control	0	100-100-150

## **RESULTS**

Comparison yields in 2003 showed no significant differences between November and March applications of compost. Also, there was no significant difference between the supplemental rate on 50 or 100 lbs nitrogen per acre with the exception of the January application at the 200 N rate (Table 1.) In all cases, the 50 and 100 lb rates of supplemental nitrogen were statistically lower than both the November and March application under all supplemental nitrogen applications.

Again in 2004, there was no significant difference in yield between the November and March applications of compost at all rates. In three of six instances, the application of 100 lbs of supplemental nitrogen was statistically better than the 50 lb rate indicating that the compost's ability to supply adequate nitrogen in the second year is somewhat reduced. In all cases, supplemental nitrogen at the 50 and 100 lb rates produced significantly better yields than compost without supplemental nitrogen. The January compost application again produced unusual results with the yields being reduced as application rates went up.

<b>Table 1: Effects on N Rate and Application Timing on Coastal Bermudagrass Yield (lbs/acre)- Compost at 200 N Rate, 2003</b>				
	Nitrogen Rate			
Application	0*	50	100	Average
November*	10,040 ab B	----	17,092 A	13,566
January	9,042 b C	15,725 B	17,913 A	14,227
March	10,422 aB	16,533 A	17,637 A	14,864
Average	9,835	16,129	17,547	

\*Means within a column followed by a similar lower case letter or with in a row followed by a similar upper case letter do not differ (P=.05, LSD)

## **CONCLUSION**

Effects of compost application timing should be most prevalent in the first season after applications. The results of this study do not provide any clear statistical data that application in November, January, or March significantly affected forage yields in 2003. While there are some statistical differences when comparing the January to November and March applications, these do not follow a pattern that one would expect when considering possible nutrient loss from early applications or lack of nutrient availability from late applications. Application timing also had little influence on crude protein levels,

Compost without supplemental nitrogen produced good yields in 2003 with averages in the 4 to 5 ton range, but crude protein levels were 10% or less. The addition of 50 lbs of nitrogen made significant improvements in both yields and crude protein levels. In most instances in 2003, the application of 100 lbs of supplemental nitrogen did not significantly increase forage yield although crude protein levels were higher in all cases. In 2004, average yields without supplemental nitrogen had fallen to less than 4 tons/acre. These yields were doubled by the application of 50 lbs of supplemental nitrogen. In this second year, 100 lbs of supplemental nitrogen was significantly better than 50 lbs of nitrogen in 50% of cases. These results would be expected as the nitrogen in the compost becomes depleted.

Dairy manure compost is a good source of nutrients especially when supplemented with commercial nitrogen fertilizer. The level of supplementation depends on the forage producer's yield and quality goals. It would be necessary to increase supplementation as nitrogen levels are depleted over time to maintain yields and crude protein levels. Timing of compost application showed little influence on forage yields. Climatic conditions such as temperature and rainfall following the application can have large influences on both the loss of nutrients (especially nitrogen) if the compost is applied too early and the availability of nutrients if the compost is applied too near the growing season. Producers should also consider costs associated with transport and application of this material and weigh them against the cost of commercial fertilizers