

# Nitrogen Fertilizer Effects on Yield and Composition of COASTAL BERMUDAGRASS FORAGE

Forage yields of Coastal Bermudagrass almost doubled following application of the first 400 pounds of nitrogen, as compared with unfertilized check plots, in recent trials at Imperial Valley Field Station. However, additional nitrogen up to 1,600 pounds per acre increased yields only slightly and production dropped off when 2,000 pounds of nitrogen was applied. Late application of nitrogen did not prolong the growing season into the late fall. Heavy applications of fertilizer did not cause an appreciable increase of salt in the soil nor excessive accumulation of nitrate nitrogen in the forage.

**A** NITROGEN FERTILIZER experiment was conducted on a Coastal Bermudagrass pasture during the 1961 growing season to determine the most profitable amount of nitrogen to apply, as well as the application rate for maximum yields. The test at Imperial Valley Field Station was conducted on Holtville clay loam with a pH of 7 to 8.

The plots were basins 24 feet wide and 36 feet long, with yields obtained by clipping a strip 3½ by 20 feet diagonally across the plot. The experiment was set up in a randomized block design, replicated four times. Six rates of nitrogen, 0, 400, 800, 1,200, 1,600, and 2,000 pounds per acre, were supplied from ammonium

RESPONSE OF COASTAL BERMUDAGRASS TO DIFFERENT RATES OF NITROGEN FERTILIZATION APPLIED AS AMMONIUM SULFATE

Nitrogen applied	Forage yield	Protein	Crude fiber	Lignin
Lbs./Acre	Tons/A.	%	%	%
0	4.87	10.3	27.4	8.32
400	9.00	11.4	27.7	8.41
800	11.39	14.4	27.1	8.38
1200	12.20	15.7	26.9	8.44
1600	12.73	17.0	26.5	7.99
2000	12.51	16.8	26.7	8.07
LSD 5%	1.46			
1%	2.02			

sulfate (21 per cent). The extremely high rates were included to determine at what level of nitrogen application yield increases would cease to occur. Earliest applications were made in mid-March with subsequent applications after each cutting made at approximately monthly intervals. Rates of application were 100, 200, or 300 pounds depending on treatment.

The plots were clipped seven times starting in May and ending with the last clipping on November 27, a growth period of three to seven weeks per cutting. Following each cutting, the basins were flood irrigated and received an average of two irrigations per cutting. Chemical analyses to determine protein, fiber, lignin and nitrate nitrogen were recorded on the graph and table.

### Forage yields

Forage yields of Coastal Bermudagrass for 1961 are shown in the graph. Total forage yields for the season increased up to the application of 1,600 pounds of nitrogen, but decreased slightly when 2,000 pounds of nitrogen were applied. The first 400 pounds of nitrogen almost doubled the yield over the unfertilized check plot. Application of 800 pounds produced additional yield increases, but rates above this level increased yields only slightly. The small increase in yields obtained from applications above 800 pounds was attributed almost entirely to increases in production obtained on the first two cuttings made on May 11 and June 8.

Late application of nitrogen did not prolong the growing season into late fall. Growth from October 9 to the last cutting November 27 produced an average of only .31 ton of dry matter.

Salt did not increase appreciably due to the heavy application of fertilizer. Although high rates of nitrogen increased concentrations of nitrate nitrogen in the

forage, even the highest amounts were far below levels which cause toxicity to animals. Analyses for protein, crude fiber and lignin are frequently used as indicators of quality in forage. Protein, which is low in Bermudagrass as compared with many other forages, was increased from 10.3 to 17.0 per cent by high nitrogen rates. Crude fiber and lignin were not affected appreciably by nitrogen. The main value of nitrogen was to increase yields.

Considering costs and returns, application rates of 400 pounds per acre were definitely profitable. An additional 400 pounds produced about two tons of additional forage, an increase which (from the economical point of view) is marginal. Higher rates were unprofitable.

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