

**FORAGE AND BEEF CATTLE RESEARCH**

**1980 - Overton**

**RESEARCH CENTER**

**TECHNICAL REPORT NO. 80-1**

## NITRATE CONTENT OF FOUR BERMUDAGRASSES

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### SUMMARY

The summer drought of 1978 created renewed concern in nitrate content of both grazed and hayed forage since several animal deaths during that season were attributed to nitrate poisoning. Four bermudagrasses, Coastal, Coastcross I, Callie, and Alicia were harvested at 7- and 28-day intervals to simulate continuous grazing and haying schedules. All plots received 100-100-100 lbs/acre of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O on March 28, and 60 lbs/acre after each 28-day harvest. Percent nitrate-nitrogen was highest in Callie bermudagrass harvested at 28-day intervals, and ranged from 0.328% on June 22 to 0.718% on September 14. Both Coastal and Alicia had the lowest nitrate content from the 28-day frequency. At the 7-day harvests, Callie had percent nitrate concentrations that were nearly double those of the other grasses and ranged from 1.891% on May 4 to 0.410% on August 24. On an average, nitrate-nitrogen was greater than 0.7% at 10 of the 24 weekly harvests.

### OBJECTIVE

To quantify the monthly nitrate concentration of four bermudagrass varieties harvested at two frequencies during periods of drought stress.

### PROCEDURES

Coastal, Callie, Coastcross I, and Alicia bermudagrass were established in 8'x24' plots in a 4 replicated randomized complete block design. Sub-plots were harvested to a 2-inch height at either 7- or 28-day intervals. All plots received 100-100-100 lbs/ac of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O on March 28 and 60 lbs/ac N after each 28-day harvest. Percent nitrate-nitrogen was monitored via specific ion electrode.

### RESULTS

Table 1 shows the fertilizer rates and dates during the 1978 growing season to give a season total of 340-100-100 lbs/acre N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O. Table 2 presents the actual rainfall received in addition to the deviation from the 30-year average. The low monthly rainfall totals were confounded even

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more by the number of rainfall occurrences. Monthly nitrate-nitrogen content of the four bermudagrasses harvested at 7- and 28-day intervals are shown in Tables 3-8. Callie bermudagrass was generally higher in nitrate-nitrogen content at both the 7-day and 28-day harvest frequencies. On the other hand, Coastal and Alicia usually had the lowest nitrate-nitrogen content.

Table 1. Fertilizer schedule for bermudagrasses.

<u>DATE</u>	<u>SOURCE</u>	<u>RATE (lbs/ac)</u>
3-28	12-12-12	100-100-100
5-29	33.5-0-0	60-0-0
6-30	33.5-0-0	60-0-0
7-31	33.5-0-0	60-0-0
8-28	33.5-0-0	60-0-0
TOTAL		340-100-100

Table 2. Rainfall distribution during 1978 growing season.

<u>MONTH</u>	<u>AMOUNT</u> (inches)	<u>OCCURRENCES</u>	<u>DEVIATION FROM</u> <u>30 YR AVG.</u>
Apr	1.16	5	-3.69
May	4.20	5	-1.05
Jun	0.39	3	-3.14
Jul	2.14	4	-1.34
Aug	1.55	5	-1.27
Sep	0.95	6	-1.85
TOTAL	10.39	28	-12.34

Table 3. Percent nitrate-nitrogen of four bermudagrasses during May.

<u>DATE</u>	<u>COASTAL</u>	<u>ALICIA</u>	<u>COASTCROSS</u>	<u>CALLIE</u>
	%			
5-4	.510 b	.598 b	.658 a	1.891 b
5-11	.262 c	.375 bc	.456 b	.957 a
5-18	.284 b	.310 b	.533 b	.913 a
5-25	.220 b	.218 b	.318 ab	.390 a
5-25*	.304 b	.328 b	.462 ab	.513 a

Table 4. Percent nitrate-nitrogen of four bermudagrasses during June.

<u>DATE</u>	<u>COASTAL</u>	<u>ALICIA</u>	<u>COASTCROSS</u>	<u>CALLIE</u>
	%			
6-1	.411 c	.586 ab	.510 b	.636 a
6-8	.315 b	.284 b	.408 ab	.557 a
6-15	.298 b	.328 b	.373 b	.555 a
6-22	.253 b	.277 b	.295 b	.423 a
6-22*	.234 a	.290 a	.328 a	.235 a
6-29	.485 b	.318 a	.420 b	.450 b

Table 5. Percent nitrate-nitrogen of four bermudagrasses during July.

<u>DATE</u>	<u>COASTAL</u>	<u>ALICIA</u>	<u>COASTCROSS</u>	<u>CALLIE</u>
	%			
7-6	.518 c	.569 c	.728 b	1.076 a
7-13	.384 b	.397 b	.494 b	.780 a
7-20	.316 b	.314 b	.392 b	.530 a
7-20*	.288 b	.384 b	.341 b	.525 a
7-28	.420 b	.713 a	.696 a	.835 a

abc Percent nitrate followed by the same letter in any row are not significantly different at the 0.05 level.

\*28-day harvest interval



Table 6. Percent nitrate-nitrogen of four bermudagrasses during August.

<u>DATE</u>	<u>COASTAL</u>	<u>ALICIA</u>	<u>COASTCROSS</u>	<u>CALLIE</u>
	%			
8-3	.261 b	.265 b	.362 b	.502 a
8-10	.434 b	.459 b	.633 b	1.016 a
8-17	.380 b	.339 b	.496 ab	.720 a
8-17*	.272 b	.328 b	.356 ab	.456 a
8-24	.260 a	.233 a	.293 a	.410 a
8-31	.260 c	.371 bc	.535 b	.765 a

Table 7. Percent nitrate-nitrogen of four bermudagrasses during September.

<u>DATE</u>	<u>COASTAL</u>	<u>ALICIA</u>	<u>COASTCROSS</u>	<u>CALLIE</u>
	%			
9-7	.307 b	.301 b	.431 b	.787 a
9-14	.248 c	.278 c	.471 b	.622 a
9-14*	.304 b	.299 b	.341 b	.718 a
9-21	.307 b	.282 b	.388 b	.665 a
9-27	.336 b	.315 b	.436 b	.693 a

Table 8. Percent nitrate-nitrogen of four bermudagrasses during October.

<u>DATE</u>	<u>COASTAL</u>	<u>ALICIA</u>	<u>COASTCROSS</u>	<u>CALLIE</u>
	%			
10-5	.255 b	.246 b	.320 b	.537 a
10-12	.257 b	.235 b	.267 b	.475 a
10-12*	.234 b	.240 b	.256 b	.462 a

abc Percent nitrate followed by the same letter in any row are not significantly different at the 0.05 level.

\*28-day harvest interval