PUBLICATIONS

1981

Forage Research in Texas

Departmental Technical Report No. 81-12

Department of Soil and Crop Sciences

BY - 0073

Project: H-6443

Workers: F.M. Rouquette, Jr.
M.J. Florence

Location: Overton

DRY MATTER PRODUCTION AND VIGOR OF BERMUDAGRASS SELECTIONS

OBJECTIVES:

Evaluate various bermudagrass selections for dry matter production, vigor, and density of stand at 7-, 14-, and 28-day harvest frequencies.

PROCEDURE:

Eight bermudagrass selections were arranged in a randomized complete block design with four replications. Each main plot, 8'x24', was split into three subplots of 8'x8' dimension. Subplots of bermudagrass were then used to collect yield data at 7-, 14-, and 28-day harvest frequencies. The 7- and 14- day frequency plots were harvested with a reel-mower; whereas, the 28-day frequency plots were harvested with a sickle mower. All plots were cut to a 2-inch stubble height. Each year of the three year study, a balanced fertilizer was applied at the rate of 100-100-100 lbs/ac of N-P_2O_5-K_2O in early to mid-April. Thereafter, 60 lbs/ac N was applied to all plots after the 28-day harvest. The season total of applied fertilizer was 340-100-100.

RESULTS AND DISCUSSION:

Total seasonal and 3-year average dry matter yields of the eight bermudagrass selections, averaged across harvest frequency, are shown in Table 1. Selection 66 produced more forage over the 3-year period than any of the other selections. Callie and S-16, on the other hand, had the least forage production of the bermudagrasses tested. Table 2 shows the average daily yield of the bermudagrasses as influenced by harvest frequency. Selection 66 and Coastal bermudagrass had the highest 3-year average forage yield when harvested at either 7- or 28-day intervals. At the 14-day harvest, S-66 produced more forage than all other selections. Callie, S-16, and S-54 produced significantly less forage than those selections tested.

The average daily and seasonal dry matter yields of all selections harvested at 7-,14-, and 28-day intervals are shown in Table 3. In each year, both daily and seasonal forage production was highest from the 28-day interval. The 14-day harvest was intermediate; whereas, the 7-day

frequency was the most detrimental to dry matter production and had the least yield. Table 4 shows the influence of harvest frequency at each harvest date throughout the season for the 3-year period. The first harvest date consistently outyielded the remaining harvests. Although the second highest harvest production was directly related to rainfall, the second, third, and fourth harvest periods were similar in total yield for the 3-year period. The sixth harvest was consistently low in dry matter production, and this was due to length of day, temperatures, and lack of rainfall. Table 5 shows the 3-year average yield of all selections at each harvest date. Yields are compared among selections for each harvest date. Alicia had the highest production for the first harvest, S-66 for the second and fifth harvests, S-66 and Coastal for the third harvest, and Coastcross I for the fourth and sixth harvest periods. It is interesting to note that Alicia also had the lowest yield during the fifth and sixth harvest periods. Callie, S-16, and S-54 consistently produced the lowest yield at all other harvest dates.

At the end of the 3-year study, each selection was visually rated for its degree of persistence or ability to withstand the defoliation pressures of the 7-, 14-, and 28-day harvest frequencies. Relative vigor ratings for each selection is presented in Table 6. Coastal and Alicia had the highest vigor ratings at all harvest intervals. In addition, SS-16 had one of the highest ratings when harvested at the 7-day interval. Selection S-16 had the lowest ratings at the 7- and 14-day intervals; whereas, Callie had the lowest rating at the 28-day harvest. Thus, from these ratings, these two selections would not be expected to contribute to the forage programs of Northeast Texas. Table 7 presents visual scoring data for the density of the bermudagrass stand at the end of the 3-year period. Again, Coastal and Alicia had the highest ratings and S-16 had the lowest ratings. The low ratings were primarily due to the invasion of common bermudagrass which tended to increase in percent stand in S-16, Callie, and S-54.

Table 1. Average yield of bermudagrass selections

Bermudagrass Selection	Dry matter yield (kg/ha) Year 1	Year 2	Year 3	Avg.
S-66	11826 a	7363 a	9126 a	9438 a[1/]
Coastal	10242 b	7594 a	8819 ab	8885 b
Alicia	10753 b	7477 a	7343 c	8524 b
Coastcross	10388 b	6565 b	6518 d	7824 c
SS-16	8383 cd	5636 c	8383 b	7468 c
S-54	9157 c	5355 cd	6373 d	6962 d
S-16	9004 c	4781 de	5669 e	6485 de
Callie	7986 d	4593 e	5544 e	6041 e

[1/] Yields within a column and followed by the same letter are not significantly different at the 0.05 level using Duncan's Multiple Range Test.

Table 2. Daily dry matter yields of bermudagrass selections as influenced by harvest frequency

Bermudagrass Selection	Year 1			Year 2			Year 3			3-year avg.		
	7-day	14-day	28-day	7-day	14-day	28-day	7-day	14-day	28-day	7-day	14-day	28-day
S-66	48.0 a	63.1 a	98.8 a	25.8 b	36.5 ab	69.2 a	38.6 a	47.4 a	78.0 a	37.5 a	48.9 a	82.0 a[1/]
Coastal	44.4 a	53.3 a	84.2 a	30.1 a	34.6 ab	70.9 a	35.2 b	44.2 a	79.0 a	36.5 ab	44.0 b	78.1 ab
Alicia	44.7 a	56.8 b	89.5 ab	30.5 a	41.1 a	61.9 ab	26.8 c	36.7 b	68.3 a	34.0 b	44.9 b	73.2 b
Coastcross I	44.0 a	53.5 b	86.8 ab	27.4 b	36.3 ab	53.4 bc	33.6 b	35.4 bc	48.0 b	35.1 ab	41.8 bc	62.7 c
SS-16	35.8 b	44.4 cd	68.7 c	21.8 c	29.6 bc	49.3 cd	32.9 b	46.5 a	71.3 a	30.2 c	40.1 c	63.1 c
S-54	36.6 b	47.8 c	78.2 bc	16.7 e	26.3 c	52.6 bc	26.5 c	34.4 bc	53.6 b	26.5 d	36.2 d	61.5 c
S-16	36.8 b	46.0 cd	77.1 bc	18.0 de	24.9 c	42.4 cd	23.3 d	30.4 c	48.3 b	26.1 d	33.7 de	55.9 cd
Callie	32.9 b	41.2 d	67.5 c	19.3 d	23.4 c	39.3 d	27.2 c	29.7 c	43.1 b	26.4 d	31.5 e	50.1 d

[1/] Yields within a column and followed by the same letter are not significantly different at the 0.05 level using Duncan's Multiple Range Test.

Table 3. Average dry matter yield of all selections harvested at three frequencies

Frequency	Forage Production (kg/ha)							
	Year 1		Year 2		Year 3		Avg.	
	Daily	Season	Daily	Season	Daily	Season	Daily	Season
7-day	40.4 c	6831 c	23.7 c	3985 c	30.5 c	5095 c	31.6 c	5303 c[1/]
14-day	50.7 b	8576 b	31.6 b	5304 b	38.1 b	6357 b	40.1 b	6746 b
28-day	81.3 a	13746 a	54.9 a	9222 a	61.3 a	10239 a	65.9 a	11069 a

[1/] Yields within a column and followed by the same letter are not significantly different at the 0.05 level using Duncan's Multiple Range Test.

Table 4. Distribution of dry matter throughout the season

	Average Daily Yield (kg/ha)											
	Year 1			Year 2			Year 3			3-Year Avg.		
Harvest	7-day	14-day	28-day	7-day	14-day	28-day	7-day	14-day	28-day	7-day	14-day	28-day
1	75.3 a	111.1 a	187.9 a	43.8 a	78.2 a	166.5 a	24.3 d	59.4 a	130.7 a	47.8 a	82.9 a	162.1 a[1/]
2	34.7 c	42.0 c	85.8 b	27.9 b	28.4 b	38.4 bc	26.1 cd	34.3 c	55.1 c	29.6 c	34.9 b	59.8 b
3	38.4 bc	36.6 d	43.0 e	20.2 c	26.8 b	40.2 b	39.9 b	42.1 b	57.8 bc	32.8 b	35.2 b	47.0 c
4	40.1 b	47.0 b	72.5 c	17.4 d	16.9 c	29.8 cd	46.3 a	45.5 b	65.9 b	34.6 b	36.5 b	56.0 b
5	27.2 d	37.1 d	56.0 d	19.9 c	22.6 bc	30.7 cd	27.8 c	30.9 c	38.6 d	25.0 d	30.1 c	41.8 c
6	26.9 d	30.7 e	42.9 e	13.2 e	16.6 c	23.6 d	18.7 e	16.5 d	22.2 e	19.6 e	21.3 d	29.6 d

[1/] Yields within a column and followed by the same letter are not significantly different at the 0.05 level using Duncan's Multiple Range Test.

Table 5. Daily dry matter yield of bermudagrass selections by harvest

Bermudagrass Selection	Time of Harvest - (3-Year Avg.)					
	1st	2nd	3rd	4th	5th	6th
	kg/ha					
S-66	122.6 b	54.5 a	47.4 a	48.3 b	38.8 a	25.2 b[1/]
Coastal	112.9 bc	48.3 b	45.9 ab	48.2 b	36.3 b	25.8 b
Coastcross I	77.1 e	43.2 c	42.9 bc	52.8 a	35.3 b	27.9 a
Alicia	133.6 a	42.9 c	40.5 c	39.8 cd	21.1 de	19.3 d
SS-16	104.8 cd	38.1 d	33.4 d	37.5 cde	30.0 cd	22.8 c
S-54	97.9 d	35.3 d	31.9 d	34.7 e	26.8 e	22.0 c
S-16	75.0 e	34.5 d	31.0 d	36.4 de	31.2 c	23.2 c
Callie	53.4 f	34.5 d	33.5 d	41.3 c	31.8 c	21.6 c

[1/] Yields within a column and followed by the same letter are not significantly different at the 0.05 level using Duncan's Multiple Range Test.

Table 6. Vigor ratings for bermudagrass selections harvested at three frequencies

Bermudagrass Selection	Harvest Frequencies			
	7-day	14-day	28-day	Avg.
Coastal	9.94 a	9.75 a	9.94 a	9.88 a[1/]
Alicia	9.75 a	9.88 a	9.88 a	9.83 a
SS-16	9.25 a	8.00 b	7.63 b	8.29 b
Coastcross I	7.00 b	7.81 b	6.69 c	7.17 c
S-66	5.88 c	5.56 c	6.63 c	6.02 d
S-54	3.13 d	3.50 d	5.44 d	4.02 e
Callie	3.56 d	2.31 e	2.00 f	2.63 f
S-16	2.13 e	2.25 e	2.75 e	2.38 f

[1/] Vigor ratings were intended to represent the selections' vulnerability to invasion by other grass and broadleaf species, and especially common bermudagrass. Rating scale (10 = no invasion of weeds; 5 = 50% invasion of weeds; 2 = 80% invasion of weeds; et cetera).

Table 7. Density ratings for bermudagrass selections harvested at three frequencies

Bermudagrass Selection	Harvest Frequencies			
	7-day	14-day	28-day	Avg.
Coastal	9.81 a	9.13 a	8.38 a	9.10 a[1/]
Alicia	9.75 a	9.25 a	8.44 a	9.14 a
SS-16	8.56 b	7.31 b	6.44 b	7.43 b
Coastcross I	7.13 c	7.31 b	5.75 b	6.73 c
S-66	5.69 d	5.69 c	5.88 b	5.75 d
S-54	3.50 f	3.00 d	3.94 c	3.48 e
Callie	4.38 e	2.25 e	2.00 d	2.87 f
S-16	2.19 g	2.31 de	2.56 d	2.35 g

[1/] Density ratings were intended to represent the percent of ground actually covered by the selection. Rating scale (10 = 100% cover; 5 = 50% cover; 2 = 20% cover, et cetera).