Tifton 85 and Tifton 78 Bermudagrasses: Grazing Performance and Pasture Quality

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INTRODUCTION

A new hybrid bermudagrass, Tifton 85, was released to certified growers in May, 1992. Tifton 85 joins the long list of successful bermudagrasses developed at the Coastal Plain Experiment Station, which includes Coastal, Tifton 44 (Burton and Monson, 1978) and Tifton 78 (Burton and Monson, 1988). Several other high quality and high producing cultivars have been released, including Coastcross-1 (Burton, 1972) and Tifton 68 (Burton and Monson, 1984), that are not grazed in Georgia because of inadequate cold tolerance. Tifton 85 was screened through small plot experiments for several years, and emerged as a highly productive and high quality grass compared with other bermudagrass hybrids.

Tifton 85 is darker green in color, is taller, and has larger stems with wider leaves than Coastal, Tifton 44 or Tifton 78, and it is higher in quality than Coastal. It has large rhizomes and very large stolons that spread rapidly and quickly cover the ground. Tifton 85 can be established from either sprigs or top growth material. Cold tolerance of Tifton 85 is lower than for Coastal or Tifton 44, but it has survived in small plot clipping tests in Athens and Eatonton, GA.

Prior to the development of Tifton 85, Tifton 78 was the most productive and highest quality bermudagrass hybrid available to Southeastern cattlemen. Tifton 78 is a sterile F_1 hybrid between Tifton 44 and Callie bermudagrasses, and it has yielded 25% more DM that was 7% higher in in vitro dry matter disappearance (IVDMD) compared with Coastal in 3-yr clipping tests (Burton and Monson, 1988). Although not as tall or productive as Tifton 85, Tifton 78 spreads faster and is easier to establish than Coastal. Tifton 78 can be established by planting sprigs or by broadcasting green stems cut at an advanced hay stage and disking into moist soil. Tifton 78 was released in 1984 and has been widely distributed from the Carolinas to Texas. Many successes and many failures have been reported concerning establishment and maintenance of stands across the region. Attention to soil moisture and soil compaction at planting time, use of viable, healthy sprigs and top growth forage for planting, and care in properly fertilizing and grazing during the initial year of establishment are key factors contributing to producer success or failure with this hybrid. Higher levels of K_2O (potash) are required by the more productive hybrids to maintain stands.

In addition to small-plot trials, several trials were conducted with grazing steers to evaluate Tifton 78 and Tifton 85 bermudagrasses. Pasture quality was determined in recent trials comparing Tifton 78 to Coastal, and Tifton 78 with Tifton 85.

EXPERIMENTAL PROCEDURE

Trial 1. Tifton 78 vs. Coastal. In 1983, 1984 and 1985, Tifton 78 was compared with Coastal in a grazing trial including two pastures of each forage on Tifton sandy loam soils. Residual forage was removed by burning in late February each year. Pastures received 75 lb N/acre in mid-March and mid-July, with P_2O_5 and K_2O applied with N in mid-March to provide a 4:1:2 ratio of $N:P_2O_5:K_2O$ annually. Eighty fall-weaned steers that had been wintered on hay and grain supplements were assigned to the pastures during the 3-yr study. Steers were assigned by breeding and weight (569 lb average initial weight) to four groups each year, and groups were randomly assigned to Coastal or Tifton 78 pastures. Steers were treated for prevention of

internal parasites on d 1 each year, and mineral supplements were provided free-choice in each pasture.

Pastures were grazed continuously from April 10 to late September each year. Coastal pastures were initially stocked with 2.5 steers/acre in each replicate pasture in April, and stocking rates were increased to 3.0 steers/acre by June. Tifton 78 pastures were also initially stocked with 2.5 steers/acre, and stocking rates increased to approximately 3.5 steers/acre by mid-May. The higher stocking rates were then maintained for each pasture until grazing was terminated in late September each year.

Trial 2. Tifton 78 vs. Tifton 85.

In 1988, two 2-acre pastures were planted in Tifton 85 and two were planted in Tifton 78 at the University of Georgia Coastal Plain Station, Tifton. A 3-year grazing experiment began in 1989 and continued through 1991. Pastures were fertilized with 225 lb N/acre each year, divided into three applications of 75 lb N/acre in March, June and August. Phosphorus and potassium were applied to provide a 4:1:2 ratio of $N:P_2O_5:K_2O$.

Steers used in the experiment were weaned in September each year, wintered on a hay and grain diet, and began grazing bermudagrass pastures in April each year at 12 to 14 months of age. The experiment was designed to evaluate grazing performance while maintaining pasture growth at approximately 2500 lb of dry forage per acre. At 14-day intervals, 34 forage estimates from each pasture were made and pasture stocking rates were adjusted to maintain the 2500 lb/acre of available dry matter within each pasture. Four steers, designated as testers, were assigned at random to each pasture and these steers grazed continuously. Additional steers, designated as grazers, were added or removed from the pastures at 14-day intervals depending upon the level of available dry forage in relation to the target of 2500 lb of dry forage/acre. Steers were weighed at 28-day intervals, and initial and final weights were averages of two consecutive daily weights. Trace mineralized salt and water were offered free-choice within each pasture.

Two steers with esophageal cannulas grazed each of the four pastures twice at 7-day intervals in late May, mid-July and early September each year. Forage samples from these steers were used to determine quality of the forage actually being consumed by the steers at three times during the grazing season each year. Four samples were collected per pasture for each of the sampling dates, and analyzed for acid insoluble ash, crude protein, fiber components [acid detergent fiber (ADF) and neutral detergent fiber (NDF)] and IVDMD.

RESULTS AND DISCUSSION

Tifton 78 has been established on many farms since it was released in 1984. It has produced more DM yield than Coastal (Burton and Monson, 1988) and has produced high quality hay at our experiment station and on many farms in the Southeast. The initial grazing performance trial data are shown in Table 1 for the comparison of Tifton 78 with Coastal. Steers grazing Coastal and Tifton 78 pastures had similar body weight gains during May and June each year, but from July through September steers grazing Tifton 78 pastures had higher ($P < .05$) weight gains at each 28-day weighing date.

During the April to October 168-d grazing season in the 3-yr trial, tester steers grazing Tifton 78 pastures had 15.2% higher ($P < .05$) average daily gain (ADG) compared with steers grazing Coastal pastures (Table 1). Increased stocking rates on Tifton 78 pastures from May to September in all years resulted in a 19.4% ($P < .01$) increase in steer grazing days/acre for Tifton 78 compared with Coastal. Increased ADG and increased steer grazing days/acre resulted in a 38.1% increase ($P < .01$) in steer gain/acre for Tifton 78 compared with Coastal. Steer ADG, grazing days/acre and gain/acre were unaffected ($P > .20$) by year by forage interactions. Year of study affected steer grazing days/acre and gain/ acre ($P < .10$). In 1984, the second year of the study, a higher proportion of tester steers assigned to Coastal and Tifton 78 pastures were larger framed crossbred steers than in other years, although initial weights of tester steers were similar in all three years

(initial wt: 1983 = 558 lb; 1984 = 564 lb; and 1985 = 586 lb).

Increased weight gain observed in the initial Tifton 78 grazing study was verified in a subsequent 3-yr study (Hill et al. 1990) in which four pastures of Coastal and four pastures of Tifton 78 were compared. In that study available forage DM was maintained at approximately 3100 lb/acre in all pastures using put-and-take grazing management, resulting in 25% higher ADG and 23.5% higher gain/acre for Tifton 78 compared with Coastal [Coastal vs. Tifton 78: ADG = 1.15 vs. 1.43 lb, ($P < .01$); Gain/acre = 569 vs. 703 lb, ($P < .01$)]. During the last two years of that study, esophageal cannulated steers grazed each pasture in June and August, and IVDMD of esophageal extrusa samples were higher for Tifton 78 compared with Coastal [two-year mean IVDMD: Coastal = 52.8%; Tifton 78 = 56.7%; ($P < .05$].

Tifton 85 has not been directly compared with other bermudagrass hybrids in hay production systems to date. Potential hay yield and quality of Tifton 85 are expected to be higher compared with Coastal. This assumption is based upon results of two small plot experiments (1985 to 1988; 1989 to 1991) in which Tifton 85 dry matter yield averaged 26% higher and IVDMD averaged 11% higher than Coastal (Hill et al., 1993b). Additional research has indicated that yields may be only slightly higher for Tifton 85 at Eatonton, GA, and marginally lower at Athens, GA, compared with Tifton 44 and Coastal. Cooler temperatures in winter and spring and different soil types probably contributed to reduced yields of Tifton 85 in these locations. No problems with reduced yields attributed to winter/spring tempera-tures or to summer drought have been observed for pastures or hay meadows established since 1988 at Tifton, GA.

In 1991, an 8-acre hay meadow of Tifton 85 was harvested on several occasions at Tifton, GA. Hay samples (6 samples from several square bales) from the September 3, 1991, harvest at 42-days of maturity averaged 13.91% crude protein (DM basis) and 90.2% dry matter. A yield of 1.2 tons of hay per acre was recorded for this harvest date. These results suggest that good quality hay can be obtained from Tifton 85 fields under proper management. Tifton 85 and Tifton 78 are both high yielding, fast growing hybrids that will respond to careful management. Previous research established six weeks as an optimum cutting interval for Coastal to achieve high yields without sacrificing quality caused by increasing maturity. We believe highest quality and good yields may be harvested from Tifton 78 and Tifton 85 when cutting interval is reduced to four weeks or less. Drying time may be a factor with the coarse stemmed Tifton 85 hybrid, and tedding or turning of the hay may be required to insure proper drying.

In the Tifton 85 grazing study, esophageal cannulated steers sampled each pasture in May, July and September. Acid insoluble ash (Table 2) was quite low for all treatments on all dates, with higher ($P < .05$) values recorded in July. Crude protein (Table 2) in the forage samples was similar for Tifton 78 and Tifton 85 at each sampling date, but each forage contained lower crude protein in May than in July or September. This occurred because the time interval from initial fertilizer application in March until forages were sampled in May was longer than the interval between fertilizer application and forage sampling in July and September. Fiber components (NDF and ADF) were not affected by sampling date or by kind of pasture. Forage quality, as indicated by IVDMD, was affected by sampling date and by kind of pasture. Samples collected in May and July were higher ($P < .01$) in IVDMD than those collected in September. This may be attributed to the normal decline in forage quality associated with reduced rainfall and forage growth that occurs as the season progresses into early autumn. Although treatment differences were small in May and July for the two kinds of pastures, Tifton 85 pastures had considerably higher IVDMD percentages in the September samples compared with Tifton 78 pastures.

Chemical and IVDMD differences were not dramatically different for Tifton 78 and Tifton 85, except for the September samples. This may be

explained by the fact that Tifton 78 has been proven to be one of the higher quality and higher producing bermudagrass hybrids developed and released. In this test the new hybrid, Tifton 85, was tested against our best available bermudagrass hybrid, and overall quality of Tifton 85 was shown to be somewhat higher than Tifton 78, especially later in the grazing season.

Three-year average grazing performance of steers on Tifton 78 and Tifton 85 pastures appears in Table 3. Forage available dry matter per acre averaged 2190 and 2450 lb/acre for Tifton 78 and Tifton 85. The three test years, 1989, 1990, 1991, included two wet years (1989 and 1991), and one record drought year (1990). Tester average daily gains (ADG) were similar ($P > .10$) for steers grazing Tifton 78 and Tifton 85. Steer grazing days/acre were 38% higher ($P < .01$) for Tifton 85 compared with Tifton 78. Consequently, gain/acre was 46% higher ($P < .01$) for Tifton 85 than for Tifton 78. The lower stocking rates, reflected by reduced number of steer grazing days/acre, allowed individual tester steers on Tifton 78 to gain at comparable rates with those on Tifton 85. Regardless of rainfall distribution during the three years, Tifton 85 pastures were stocked at higher rates each year than Tifton 78 pastures, and gain/acre increased for each succeeding year on Tifton 85 pastures. In our previous experiments, Tifton 78 produced 38% and 23.5% more gain/acre than Coastal, indicating that this was a potentially high producing forage. In this study, Tifton 85 clearly produced more forage of apparently higher quality, resulting in superior animal performance compared with Tifton 78.

IMPLICATIONS

Tifton 78 continues to be highly recommended as a high quality and high yielding bermudagrass cultivar for use in pasture grazing and hay production enterprises. Tifton 85 is more productive than Tifton 78, and under proper management may produce more hay and liveweight gain than Tifton 78. Tifton 85 will be of most benefit to cow-calf and hay producers in the Southeast. Yearling steers were used in our study as test animals because they are sensitive to nutritional differences in forages and body weight changes are an accurate index of potential production. We would not generally recommend grazing stocker cattle on bermudagrass pastures without cautious assessment of important economic considerations including: costs of overwintering steers, unfavorable marketing conditions if cattle were purchased in spring and sold during fall, and lower potential for gains of stocker cattle grazing bermudagrass pastures compared with winter and summer annuals. Tifton 85 is the most productive bermudagrass released to date, and management of this forage presents new opportunities for producers who wish to maximize quality of hay produced and forage grazed.

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TABLE 1. **Three-year mean performance of steers that grazed Coastal or Tifton 78 bermudagrass pastures**[a]

Item	Avg daily gain, lb	Steer grazing days/ac	Total gain, lb/ac
Pasture			
Coastal	1.30	488	635
Tifton 78	1.50	578	878
SE	.04[b]	4[c]	23[c]
Year			
1983	1.30	522	685
1984	1.65	554	914
1985	1.26	528	669
SE	.11	4[b]	53[d]

[a]Hill et al. (1993a).
[b]Means are different (P < .05).
[c]Means are different (P < .01).
[d]Means are different (P < .10).

TABLE 2. **Quality of esophageal forage samples from Tifton 78 (T78) and Tifton 85 (T85) pasture (1989-1991)**

	May		July		Sep	
Item	**T78**	**T85**	**T78**	**T85**	**T78**	**T85**
	---------- %, DM ----------					
AIA[a]	1.9	2.2	2.4	2.2	1.5	1.3
CP[b]	11.9	11.4	15.4	15.5	14.2	15.6
NDF	73.1	75.4	71.7	72.2	71.1	71.4
ADF[a]	35.0	35.2	32.8	34.8	34.4	34.2
IVDMD, %[bc]	58.8	61.9	59.4	59.1	53.1	57.3

Abbreviations: AIA=Acid insoluble ash; CP=Crude protein; NDF=Neutral detergent fiber; ADF=Acid detergent fiber; IVDMD=In vitro dry matter disappearance.
[a]Year (P < .01)
[b]Date (P < .01)
[c]Trt (P < .01).
Hill et al. (1993b).

TABLE 3. **Three-year average performance of steers grazing Tifton 78 or Tifton 85 pastures**

	Bermudagrass		
Item	**Tifton 78**	**Tifton 85**	**SE**
No. pastures	2	2	
Grazing days	169	169	
Forage DM/ac, lb	2190	2450	
Tester ADG, lb	1.43	1.47	.1
Steer grazing days/ac	534[b]	738[a]	17.0
Gain/ac	704[b]	1032[a]	41.0

[a,b]Means differ ($P < .01$).
Hill et al. (1993b).