Spring Regrowth and Steer Performance on Tifton 85 and Coastal Bermudagrass Pastures Following Sod-Seeding with Ryegrass

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SPRING REGROWTH AND STEER PERFORMANCE ON TIFTON 85 AND COASTAL BERMUDAGRASS PASTURES FOLLOWING SOD-SEEDING WITH RYEGRASS

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Abstract

Effects of autumn sod-seeded ryegrass (*Lolium multiflorum*; cv. Passerel; 37.7 kg/ha) in bermudagrass pastures (*Cynodon spp*.; cv. Coastal and cv. Tifton 85) on grazing steer performance were determined. Ryegrass was sod-seeded in three of six .81 ha pastures of each bermudagrass. Forage height was adjusted to10 cm during spring. Stocking rates were unaffected by ryegrass in Tifton 85 pastures, but they were higher ($P < .05$) for Tifton 85 than Coastal. Ryegrass increased tester steer average daily gains by 34% (.86 vs .64 kg/day; $P < .01$), and gain/ha by 26% (387 vs 306 kg/ha; $P < .05$). Higher stocking rates resulted in 22% more grazing days (515 vs 421 days/ha; $P < .01$), and 30% higher gain/ha (391 vs 301 kg/ha; $P < .05$) for Tifton 85 than Coastal pastures. Ryegrass did not affect stocking rates or steer performance on Tifton 85, but it depressed both on Coastal pastures.

Keywords: Bermudagrass, ryegrass, steer

Introduction

In temperate regions of the world, annual ryegrass provides high quality forage during late winter and spring (Bagley et al., 1990; Hoveland et al., 1978). Interseeding ryegrass into perennial grass sods has increased preweaning calf gains on bermudagrass and bahiagrass (*Paspalum notatum*) pastures (Hill et al., 1985; Hoveland et al., 1978). Sod-seeding ryegrass in bermudagrass pastures extended the spring grazing season by 60 to 70 days for cattle (Utley et al., 1978). Mooso (1988) reported depressed common bermudagrass yields following autumn sod-seeding with clover and ryegrass-clover mixtures. Tifton 85 bermudagrass (Burton et al., 1993), has greater dry matter yield, higher digestibility, and supports higher grazing cattle performance than Coastal and Tifton 78 bermudagrasses (Hill et al., 1993; Hill et al., 1997; Mandebvu et al., 1999). A 3-yr study was conducted to determine effects of autumn ryegrass sod-seeding of Coastal and Tifton 85 pastures on spring stocking rates and steer performance.

Materials and Methods

Certified bermudagrass sprigs (cv. Coastal and cv. Tifton 85) were planted in six pastures (.81 ha each) of each cultivar on Tifton sandy loam (fine-loamy, siliceous, thermic, Plinthic Kandiudults) soils in 1995. A 3-yr experiment was designed as a 2 H 2 factorial arrangement of bermudagrass (BG) pastures, Coastal (C) or Tifton 85 (T85), with sod-seeded ryegrass (R) or without sod-seeded ryegrass (NR). Three pastures of each BG cultivar were sod-seeded with R (cv. Passerel) each year (31 October, 1996 and 28 October, 1997, 37 kg/ha; 7 October, 1998, 39 kg/ha) using a no-till sod-seeder. Three pastures of each BG cultivar were not sod-seeded. Fertilizer was applied to sod-seeded pastures in early December (1996, 24-6-12, N-P_2O_5-K_2O, 280 kg/ha; 1997 and 1998 ammonium nitrate, 33.5% N, 168 kg/ha), and in early February each year (24-6-12, N-P_2O_5-K_2O, 280 kg/ha). Fertilizer was applied to all pastures (24-6-12, N-P_2O_5-K_2O, 280 kg/ha) in late-March and again in mid-May each year. Yearling beef steers were assigned by weight to sod-seeded pastures on 6 February, 1997, 8 January, 1998, and 22 January, 1999. Additional steers grazed a R pasture (cv. Passerel; 9.7 ha) from January to April each year. Four Atester@ steers from the additional R pasture were weighed and assigned to BG pastures without R (1 April, 1997; 9 April, 1998; 15 April, 1999). On these dates, four tester steers from each sod-seeded R pasture were selected, weighed, and continued grazing in a variable stocking rate system (Mott and Lucas, 1952). Steer initial and final weights were means of consecutive daily full weights. Stocking rates were varied to maintain forage height at approximately 10 cm. Ground-level forage samples (6/pasture) were dried and used to determine dry matter/ha.

Steer performance data were statistically analyzed as a split-plot in time using mixed model procedures (SAS, 1996), where replication and appropriate error terms were treated as random effects, treatments and years were treated as fixed effects. Stocking rate and forage mass data were analyzed as a split-split-plot in time using a similar model, and additional fixed effects were linear and quadratic trends over six sampling times and interactions with treatments.

Results and Discussion

The R cultivar in this study grows later into the spring than many cultivars, providing a stringent test to determine if T85 spring growth would be depressed by sod-seeded R. In 1997, R persisted until late June, but spring drought caused R to die by 22 May, 1998, and by 30 April, 1999. The 3-yr mean rainfall (cm) with percent of normal rainfall (%; normal=74-yr mean rainfall), respectively, were: March, 9.6, 80.0; April, 8.2, 85.3; May, 5.7, 66.1; and June, 9.2, 80.8. The 3-yr mean total rainfall for these months was 78.6% of normal rainfall.

In Figure 1, sod-seeding with R reduced stocking rates on CR pastures compared with C on 30 April, 26 May, 9 June, and 22 June, but did not reduce stocking rates of T85 R pastures. Performance of steers (Table 1) indicated that tester steers grazing R pastures had 34% higher average daily gains (ADG; .86 vs .64 kg/day; $P < .01$), and 26% higher gain/ha (387 vs 306 kg/ha; $P < .05$) than steers on pastures without R. The T85 pastures were stocked at higher rates than C pastures (Figure 1), but T85 pastures produced more forage than C pastures [forage mass, kg/ha, 19 May, 5 June, 20 June, respectively, by BG: C--916, 1149, 1397; T85--1330, 1781, 1671; ($P < .05$)]. This resulted in 22% more grazing days/ha for T85 (Table 1; 515 vs 421 steer days/ha; $P < .01$), and 30% higher gain/ha for T85 than C pastures (391 vs 301 kg/ha; $P < .05$). Increased steer gains on R pastures were similar to those previously reported (Utley et al., 1978; Bagley et al., 1990). Increased stocking rates and steer gains on T85 pastures were supported by comparisons of Tifton 85 with Tifton 78 pastures (Hill et al., 1993), and Tifton 85 with Coastal and Tifton 78 BG pastures

(Hill et al., 1997). Sod-seeding with R did not affect forage yield and stocking rates on T85 pastures, but it reduced forage production and stocking rates on Coastal pastures.

References

Bagley, C.P., Hill G.M., Knox J.W., Coombs D.F., Oliver W.M., Loyacano A.F., Wyatt W.E., Huffman D.C., McMillin K.W., Bidner T.D. and Saxton A.M. (1990). Year-around production of beef using maximum levels of forages. I. Stocker phase. Appl. Agric. Res. **5**:309-314.

Burton, G.W., Gates R.N. and Hill G.M. (1993). Registration of Tifton 85 bermudagrass. Crop Sci. **33**:1326.

Hill, G.M., Gates R.N. and Burton G.W. (1993). Forage quality and grazing steer performance from Tifton 85 and Tifton 78 bermudagrass pastures. J. Anim. Sci. **71**:3219-3225.

Hill, G.M., Gates R.N., West J.W. and Burton G.W. (1997). Forage quality, steer grazing performance, and milk production using Tifton 85 bermudagrass pastures and conserved forages. Proc. XVIII Int. Grassland Congress, Saskatoon, Saskatchewan, Canada. **29**: 35-36.

Hill, G.M., Utley P.R. and McCormick W.C. (1985). Evaluation of cow-calf systems using ryegrass sod-seeded in perennial pastures. J. Anim. Sci. **61**:1088-1094.

Hoveland, C.S., Anthony W.B., McGuire J.A. and Starling J.G. (1978). Beef cow-calf performance on Coastal bermudagrass overseeded with annual clovers and ryegrass. Agron. J. **70**:418-421.

Mooso, G.D. (1988). Effect of bermudagrass sod and ryegrass competition on the performance of six cool-season clovers. Rosepine Rsch. Sta. Annual Progress Report. Louisiana Agric. Exp. Sta., LSUAC, Rosepine, LA.

Mandebvu, P., West J.W., Hill G.M., Gates R.N., Hatfield R.D., Mullinix B.G., Parks A.H. and Caudle A.B. (1999). Comparison of Tifton 85 and Coastal bermudagrasses for yield, nutrient traits, intake, and digestion by growing beef steers. J. Anim. Sci. **77**:1572-1586.

Mott, G.O. and Lucas, H.L. (1952). The design, conduct, and interpretation of grazing trials on cultivated and improved pastures. Proc. VI Int. Grassland Congress. State College, Pennsylvania, USA. p. 1380.

SAS. (1996). SAS system for mixed models. SAS Institute Inc., Cary, NC, USA. 633pp.

Table 1 - Three-year mean performance of steers on Coastal or Tifton 85 bermudagrass pastures sod-seeded with Passerel ryegrass.

	Bermudagrass		Ryegrass			
Item	Coastal	Tifton 85	None	Sod-seeded	SE	Effect
No. pastures/yr (.81 ha)	6	6	6	6		
April 8 wt, kg	373.2	374.9	380.6	367.5	4.6	Y*
July 2 wt, kg[a]	438.8	439.6	429.9	448.5	2.9	R*
Tester ADG, kg (85 d)[ab]	.74	.77	.64	.86	.04	R**
Steer grazing days, (d/ha)	421	515	489	447	22.4	BG**
Gain, (kg/ha)	301	391	306	387	19.9	BG* R*

Acronyms: wt=weight; ADG= average daily gain; d=day; BG=bermudagrass cultivar treatment; R=ryegrass treatment; Y=year.
[a]July 2 wt means adjusted for tester initial weight effect (F=55, **); tester ADG was not affected by tester initial weight ($P > .15$).
[b]Four tester steers assigned to each pasture in April each year; 12 pastures had 48 tester steers each year.
**$P < .01$; *$P < .05$.

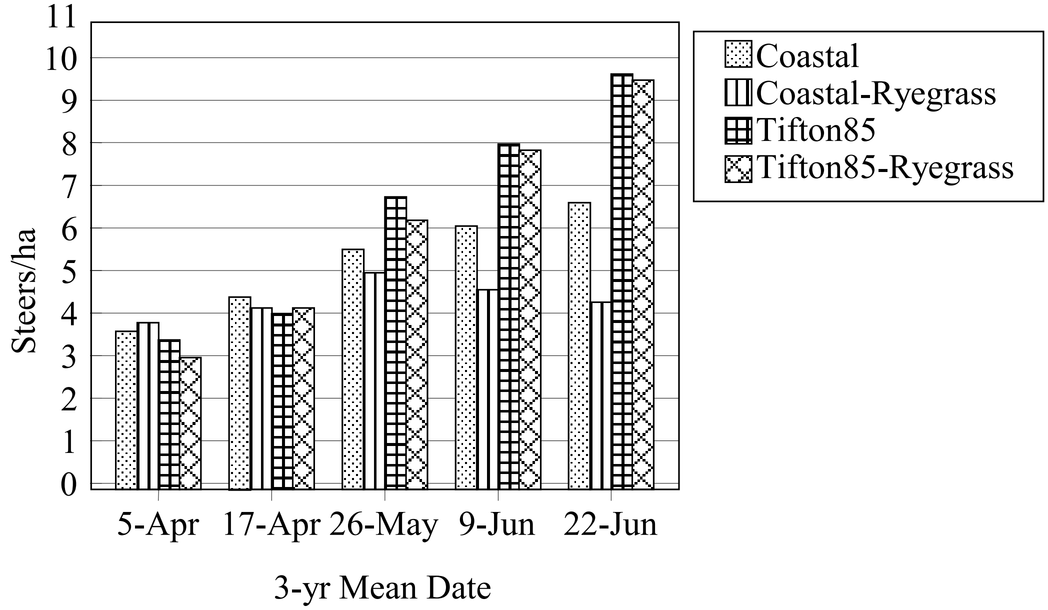

Figure 1 - Steer stocking rates on Coastal or Tifton 85 pastures with without sod-seeded ryegrass (1997, 1998, 1999)