CONTINUOUS VS 8-PASTURE ROTATIONAL STOCKING OF TIFTON 85 BERMUDAGRASS AT TWO STOCKING RATES

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Summary

In both 2008 and 2009, Tifton 85 bermudagrass was stocked with fall-born calves on a continuous (CON) vs rotational stocking (RTN) regimen with both grazing methods at two stocking rates. Average daily gain (ADG) was greater in 2008 compared to 2009. There was no difference in ADG between CON vs RTN in either year with stocker gains at about 1.5 lbs/da in 2008 and 1 lb/da in 2009. Stocking rate had the most affect on ADG with 1.8 and 1.3 lbs/da ($P < .05$) for low and high stocking rates, respectively, in 2008; and 1.2 and .8 lbs/da, respectively, ($P < .05$) in 2009. These 2-year results were in general accordance with other reported bermudagrass experimentation in that stocking rate has shown to have more affect on animal performance compared to stocking method.

Introduction

Stocking strategies and grazing systems have been incorporated by management as opportunities to enhance efficiency of forage production, forage utilization, and animal performance. For bermudagrass pastures, improved performance due to stocking method has not been documented by comparative stocking experimentation. Previous studies with Coastal, Coastcross, or other hybrid bermudagrass have shown minimal to no positive enhancement of animal gains due to stocking method (Bransby, 1983; Conrad et al, 1981; Rouquette et al, 1992). Since the release of Tifton 85 bermudagrass, there has been limited grazing research with this grass related to stocking method. The objective of this experiment was to compare fall-born stocker gains on continuous vs rotational stocking of Tifton 85 bermudagrass both at two stocking rates.

Experimental Procedures

Fall-born, ½ Simmental x ¼ Angus x ¼ Brahman steers and heifers were weaned on 5-30-08 and 6-16-09. At weaning, calves received a modified-live virus injection as described for the VAC-45 program, an 8-way clostridial vaccine, injectable dewormer, Revelor G ear implant, and a fly tag. During both years, calves were fenceline-weaned in dry lot and received ad libitum bermudagrass hay and 2 to 3 lbs/hd/da of a 1:1 corn gluten:corn supplement. Calves were weighed, body condition scored (BCS), and stratified into groups by sex and weight. Groups consisting of 3 steers and 2 heifers were randomly allocated to three replicate pastures each of the following stocking method x stocking rate treatments: 1) CON-Low; 2) CON-High; 3) RTN-Low; and 4) RTN-High. Pastures were initially stocked for a 7-10 day adjustment, and stockers were re-weighed to initiate the animal performance component of the experiment period. Stockers were condition scored at initiation and off-pasture, and weights were taken at approximate 21- to 28-day intervals.

Pastures

The primary intent of the rotational stocking scheme was twofold: 1) to not force animals to have prolonged residence on paddocks for the desire to have high utilization percent of forage; and 2) to allow forage regrowth to be regrazed within 14- to 21-days. Thus, in both years, an 8-paddock system was used in which animals were moved to a new paddock every two days. This method provided for a 2-day graze and a 14-day deferment (rest) period. The rotational scheme was used for both stocking rates and all replicates. Forage DM was harvested at ground level at approximate monthly intervals on continuous stocked pastures. On rotational stocked pastures, forage DM was taken at time of entry into a designated test paddock and at time of departure (2 days).

In 2008, pastures were fertilized with 300 lb/ac 21-8-17 on 5-20-08, and 150 lb/ac 34-0-0 on each 7-18-08 and 9-17-08 for a total fertilization of 165-24-51 lbs/ac of N-P_2O_5-K_2O. In 2009, pastures were fertilized with 300 lb/ac 21-8-17 on 5-05-09, and 150 to 160 lbs/ac 34-0-0 on each 6-02-09 and 7-10-09 for a total fertilization of 168-24-51.

Results and Discussion

Stocker ADG was higher ($P < .05$) in 2008 compared to 2009. The monthly ADG shown in Tables 1 and 2 exhibits reliable monthly trends for fall-born calves stocked on bermudagrass pastures during July to mid-October. With weaning dates of mid- to late-June, calves do not initiate the stocker phase until about the first of July. Thus, the mid-May through June period of usual high nutritive value of pastures was not incorporated for this age class of calves. The combinations of forage nutritive value, DM, climatic conditions, and age-weight conditions of these stockers has consistently shown that optimum gains usually occur within the first 60- to 75-days of stocking when cattle initiate grazing in late June to early July. In both years, there was no ADG advantage ($P > .05$) from stocking at either CON or RTN stocking method. However, there was a difference in ADG of stockers in year 2008 compared to 2009. The overall ADG in 2008 was about 1.5 lbs/da and in 2009 was about 1 lb/da. Differences in ADG between years were attributed to climatic conditions favorable for forage growth along, increased stocking rates (SR) used in 2009, and reduced forage available for consumption (Table 3). Stocking rate had a negative effect on ADG ($P < .05$) (Tables 1 and 2) in both years. In 2008, stocker ADG was 1.8 lbs/da on low stocked pastures and 1.3 lbs/da on high stocked pastures. The low stocking rate was 3.5 700-lb calves/ac; whereas, the high stocking rate was 4.5 hd/ac. In 2009, stocker ADG was 1.2 lbs/da when stocked at 4.3 hd/ac and 0.8 lbs/da when stocked at 6.1 hd/ac. In both years, stocker BCS declined ($P < .05$) with increased SR by about .3 on a 1 to 9 scoring scale.

Within a year, forage DM available for consumption was relatively similar for continuous vs rotational stocked pastures (Table 3). In 2008, there was a slight trend for reduced forage in high stocked pastures. From a forage availability perspective, it appears that additional stockers may have been required on the high stocked rates to affect ADG. However, season-long ADG differed ($P < .05$) for stockers on low stocked at 1.80 lbs/da compared to stockers on high stocked pastures at 1.31 lbs/da (Table 1). In 2009, stocking rates were increased over that in 2008 (Table 4) so that low stocked was 4.3 hd/ac and high stocked was 6.09 hd/ac. These increased stocking rates in 2009 resulted in less forage DM available compared to 2008. And,

there was more DM difference between low vs high stocked pastures which resulted in respective ADG's of 1.19 and 0.80 lbs/da. In both years, the ADG difference between stocking rates was due to forage availability differences as well as "forced consumption" of forage during the last day of residence in rotational stocked paddocks.

With respect to gain/ac, the ADG difference between low vs high stocking rate was about .5 lbs/da (2008) to .4 lbs/da (2009), and the differential stocking rate was not great enough to show gain/ac advantage for the high SR (Table 4). Thus, using nearly identical fertilization inputs for both years at about 165-24-51 lbs/ac N-P_2O_5-K_2O, gain was about 800 lbs/ac in 2008 and 525 lbs/ac, in 2009. Based on fertilizer prices in 2010, this fertilization strategy costs about $130/ac. Thus, performance in 2008 showed a fertilizer cost per pound of gain at about $0.16/lb, and in 2009 the fertilizer costs were about $0.25/lb gain. There are other costs pertaining to stocker ventures; however the fertilization component used in these experiments on Tifton 85 bermudagrass pastures was a manageable strategy under many conditions. The final off-pasture weight of these fall-born steers and heifers was similar for both years at about 900 lbs/hd (Table 5). Using Tifton 85 bermudagrass pastures for these types of stockers allows for marketing opportunities that may include direct harvest or reduced time for feedlot finishing.

Implications

Data from this initial two-year study on Tifton 85 bermudagrass as well as experimentation involving Coastal and other bermudagrass showed that stocker ADG may not be improved by grazing methods of continuous vs rotational stocking. The costs associated with implementation of additional fencing and water requirements for rotational stocking systems may have an array of positive features including animal-handling, hay production, etc. However, animal performance advantages should not be one of the expectations for rotational stocking. Stocking rate has always been the primary management strategy that has the greatest potential impact on stocker performance on bermudagrass. These studies showed that moderate to low stocking rates of about 2500 lbs BW/ac (3.5 hd/ac) under moderate fertilization in East Texas optimized fall-born stocker gains at more than 1.5 lbs/da.

Literature Cited

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Table 1. Monthly average daily gain (ADG) of stockers on Tifton 85 bermudagrass at two stocking rates of continuous and rotational stocking in 2008.

Treatment	ADG1[1] (lb/hd/da)	ADG2 (lb/hd/da)	ADG3 (lb/hd/da)	BCS[3] $_{init}$	BCS $_{final}$
Continuous	1.73 a[2]	1.75 a	1.53 a	5.42 a	5.21 a
Rotational	1.65 a	1.75 a	1.56 a	5.28 a	5.17 a
Low SR	1.91 a	1.98 a	1.80 a	5.35 a	5.35 a
High SR	1.48 b	1.54 b	1.31 b	5.32 a	5.04 b
Steers	1.74 a	1.82 a	1.63 a	5.41 a	5.28 a
Heifers	1.60 a	1.65 b	1.42 b	5.21 a	5.05 b

[1] ADG1 = 6-12-08 to 9-11-08 ADG2 = 6-12-08 to 10-03-08 ADG3 = 6-12-08 to 10-21-08
[2] Numbers within a treatment category and followed by a different letter, differ at $P < .05$.
[3] Body condition score (BCS) at initiation (6-12-08) and final (10-03-08).

Table 2. Monthly average daily gain (ADG) stockers on Tifton 85 bermudagrass at two stocking rates of continuous and rotational stocking in 2009.

Treatment	ADG1[1] (lb/hd/da)	ADG2 (lb/hd/da)	ADG3 (lb/hd/da)	BCS[3] $_{init}$	BCS $_{final}$
Continuous	1.82 a[2]	0.99 a	1.07 a	5.41 a	5.05 a
Rotational	1.80 a	0.95 a	0.92 a	5.27 a	4.77 a
Low SR	2.00 a	1.16 a	1.19 a	5.36 a	5.09 a
High SR	1.62 b	0.77 b	0.80 b	5.32 a	4.73 b
Steers	1.80 a	0.93 a	0.98 a	5.48 a	5.04 a
Heifers	1.81 a	1.01 a	1.01 a	5.19 a	4.76 a

[1] ADG1 = 7-14-09 to 9-15-09 ADG2 = 7-14-09 to 10-06-09 ADG3 = 7-14-09 to 10-27-09
[2] Numbers within a treatment category and followed by a different letter, differ at $P < .05$.
[3] Body condition score (BCS) at initiation (7-14-09) and final (10-27-09).

Table 3. Monthly Tifton 85 bermudagrass dry matter (DM) available in continuous (CON) and rotational (RTN) stocked pastures at two stocking rates in 2008 and 2009.

Stocking Method	Stocking Rate	DM (lbs/ac) 6-12-08	7-13-08	8-18-08	9-24-08	10-19-08
CON	Low	5532	9187	7794	6794	5765
CON	High	6216	7966	6486	4980	4690
RTN	Low	5387	7334	5935	5885	4952
RTN	High	5861	7875	6238	5542	4178
		DM (lbs/ac) 6-29-09	8-11-09	9-14-09	10-13-09	10-26-09
CON	Low	4630	6986	4542	3223	2962
CON	High	4929	6345	2604	2731	2082
RTN	Low	4592	6340	5127	3686	3529
RTN	High	4475	6058	3948	2570	2051

Table 4. Two year average stocker gains per animal and per acre from two stocking rates on Tifton 85 bermudagrass.

Year	Stocking Rate	Hd/Ac[1]	ADG3[2] (lb/hd/da)	Gain/An (lb)	Gain/Ac (lb/ac)
2008	Low	3.50	1.80 a[3]	236	826
2008	High	4.51	1.31 b	172	773
2009	Low	4.32	1.19 a	125	540
2009	High	6.09	0.80 b	84	512
AVE	Low	3.91	1.50 a	181	683
AVE	High	5.30	1.06 b	128	643

[1] Stocking rate based on 700 lbs = 1 stocker.

[2] ADG3 = 6-12-08 to 10-21-08 for 2008; 7-14-09 to 10-27-09

[3] Numbers within a year and item column and followed by a different letter, differ at $P < .05$.

Table 5. Initial and final weight of fall-born stockers on Tifton 85 bermudagrass.

Year	Stocking Method	Stocking Rate[1] (hd/ac)	Initial Weight (lbs)	Final Weight (lbs)
2008	Continuous	3.5	704	934
2008	Rotational	3.5	708	937
2008	Continuous	4.5	707	874
2008	Rotational	4.5	706	882
2009	Continuous	4.3	809	932
2009	Rotational	4.3	795	916
2009	Continuous	6.1	793	886
2009	Rotational	6.1	799	864

[1] Stocking rate based on 700 lbs = 1 stocker.