Season-Long Versus Intensive-Early Stocking with Stocker Cattle Grazing on Bermudagrass Pasture[1]

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Story in Brief

Our objective was to compare the performance of weaned fall-born calves managed under intensive-early (IES; 5 steers / acre for 70 days) or season-long stocking (SLS, 2.5 steers / acre for 140 days). Beginning on May 15, 105 steer calves (body weight [BW] = 479 ± 3.6 lbs) were randomly assigned to 1 of 15, 2-acre common bermudagrass pastures fertilized with 150 lbs of nitrogen (N) / acre. One of the following five treatments was randomly assigned to three pastures: SLS plus no supplement (NS), SLS plus 1.0 lb of ground corn / steer / day, SLS plus 1.1 lbs of cottonseed meal (CSM) / steer / day, IES plus NS, and IES plus corn. Steer BW did not differ ($P > .26$) among treatments on day 0; however, by day 70 SLS-corn steers (654 lbs) averaged 25 lbs heavier than SLS-NS ($P < .02$) or SLS-CSM ($P < .12$) steers. The IES-NS (582 lbs) and IES-corn steers (579 lbs) on day 70 averaged 42 lbs lighter ($P < .01$) than the SLS-NS steers. By day 140, SLS-corn (740 lbs) and SLS-CSM (702 lbs) steers were heavier ($P < .02$) than SLS-NS steers (667 lbs). When using SLS, corn increased the BW gain .50 lb / lb of corn fed; however, when IES was used no benefit was received from corn. Furthermore, CSM supplementation with SLS increased total BW gain .21 lb / lb of CSM fed. Total BW gain / acre differed ($P < .05$) among treatments with SLS-corn producing the most (648 lbs). Grazing system did not effect feedlot average daily gain (ADG [$P > .44$]), but IES (175 days on feed) calves did have a greater ($P < .10$) feedlot total gain than SLS (154 days on feed). Carcass quality was positively increased by using IES over SLS probably as a result of the longer feeding period.

Introduction

Spring and early summer average daily gains (ADG) by stocker cattle grazing common bermudagrass pasture is almost always excellent (> 2.25 lbs / day); however, late summer ADG without the use of supplementation can be somewhat disappointing (< .5 lbs / day). One grazing system that may help overcome this situation is intensive-early stocking (IES). The principle behind IES is to stock the pasture at twice the normal rate in the first half of the grazing season when animal performance is exceptionally good then move the cattle to the feedlot in July before forage quality declines. The regrowth that occurs during July through September could be harvested as hay or grazed with cows. The potential advantages to IES are a shorter grazing season, greater body weight (BW) gain / acre, higher forage utilization in the spring, and more flexibility in market timing and (or) feedlot placement. Some disadvantages for IES are lower individual animal BW gain and greater variable cost. Our objective in this trial was to compare the performance of weaned fall-born calves grazing common bermudagrass managed under IES or season-long stocking (SLS) systems.

Materials and Methods

This experiment was conducted at the Southwest Research and Extension Center in Hope, on 30 acres divided into 2-acre pastures. The soil type of the 15 pastures was a Sawyer Loam which consist of deep, moderately well drained soil that is nearly level to gently sloping (slopes, 3 to 8%) to nearly level. Published soil survey data indicate that this soil is capable of producing approximately 7.0 animal-unit-months / acre / year with common bermudagrass pasture. These swards were primarily common bermudagrass (75.7%), but also contained dallisgrass (5.2%), tall fescue (4.3%), other grasses (8.1%), white clover (4.2%), plus other forbs (2.5%).

One hundred five steer calves (average BW = 450 lbs) were obtained through a local cattle buyer (F & F Cattle Company; Hope). After a 21-day receiving period, the steers were stratified by BW and randomly divided into 15 groups. One of the following five treatments was randomly assigned to three pastures: SLS plus no supplement (NS), SLS plus 1.0 lb of ground corn / steer / day, SLS plus 1.1 lbs of cottonseed meal (CSM) / steer / day, IES plus NS, and IES plus corn. Corn and CSM were fed in isocaloric amounts.The fertilizer was applied

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as ammonium nitrate three times (in equal amounts) during the grazing season at 52-day intervals beginning on May 2. A total of 150 of nitrogen (N)/acre was applied during the experiment. The grazing season began on May 15. Steers were weighed on May 15 and at 35-day intervals unshrunk at 0630. On May 15 and August 21, the steers were implanted with Implus-S®. On a weekly basis, cattle were provided 1.67 lbs/steer of a mineral/salt mixture[1].

After completion of the grazing phase (IES, 7/24; SLS, 10/2), steers were shipped to a commercial feedlot in northeast Oklahoma (Neil Cattle Company; Welch, Oklahoma). After cattle arrived at the feedlot, they were weighed, dewormed, revaccinated for IBR, BVD, BRSV, and PI_3, and the seven *Clostridial* diseases. At the time of arrival, cattle were implanted with Synovex-S (Fort Dodge Animal Health, Overland Park, Kansas) and 120 days before slaughter were implanted with Revalor (Hoechst Roussel Vet, Warren, New Jersey). Cattle were fed a high concentrate corn-based diet (65.5 Mcal of NEg/lb of dry matter [DM]) in two pens (1 for IES, 1 for SLS) until deemed finished by the feedlot manager. The morning before shipping to a commercial slaughter plant, cattle were weighed to determine final BW. After slaughter, carcasses were weighed hot. After chilling, rib-eye area, percentage kidney-pelvic-heart fat (KPH), backfat thickness, USDA yield grade, marbling score, and quality grade score were recorded.

The data were analyzed as a split-plot design with grazing system/supplement (treatment) in the main plot and day in the sub plot. Pastures were used as experimental units and main plots were arranged in a randomized fashion. Least squares means were separated using the least significant procedure.

Results and Discussion

Grazing phase. On May 15, beginning BW did not differ (P > .70) among the treatments with an average BW of 479 ± 9.0 lb (Table 1). On July 24 (day 70), BW differed (P < .05) among grazing systems and supplements. Steers managed with SLS averaged 57 lbs greater (P < .002) than steers managed with IES (Table 1). With SLS, steers receiving corn gained 33 lbs more (P = .01) by day 70 than NS steers. By day 70, the steers supplemented with CSM tended to gain (P = .18) more than NS steers (difference = 17 lbs) and was not different (P = .21) from the BW of steers supplemented with corn (Table 1). On October 2, the BW of SLS steers supplemented with corn was 73 lbs greater (P < .01) than NS steers. Steers supplemented with CSM also were 35 lbs greater (P = .01) then NS steers, but 38 lbs less (P < .01) then the corn supplemented steers (Table 1).

Between 0 and 70 days, ADG by steers managed with SLS averaged .8 lbs greater (P < .01) than steers managed with IES (Table 1). This difference was probably the result of the IES decreasing the daily forage allowance for each steer because of the increased stocking density. Within the SLS treatment groups, ADG did not statistically differ (P > .20), but the differences among ADG do reflect a difference in BW on day 70 (Table 1). Between days 70 and 140, ADG by steers supplemented with corn was .5 lbs greater (P = .02) than NS steers; the ADG of steers supplemented with CSM was gain .3 lbs greater (P = .05) than that of NS steers. These data indicate that when using SLS over the entire grazing season, corn increased the BW gain by .5 lb/lb of supplement fed; however, CSM only increased the BW gain by .25 lb/lb of supplement fed.

The only treatment that significantly (P = .02) increased total gain/acre relative to SLS with NS was corn supplementation with cattle managed with SLS (Table 1). All other treatments did not differ (P > .20) from SLS with NS (average = 512 lbs/acre). Increased variable costs are associated with IES because of the greater number of animals; this fact calls into question the profitability potential of IES with cattle grazing common bermudagrass. Hay harvested from IES pastures in the late summer averaged 3,869 lbs of DM/acre and did not differ (P > .20) between supplementation treatments (NS vs. corn; Table 1). The value of the hay produced by using IES may offset some of the higher variable cost associated with the increased number of cattle.

Feedlot phase. On the first day at the feedlot (7/25, IES; 10/3, SLS), beginning BW differed (P < .01) among the treatments (Table 2). On July 25, beginning BW for IES steer did not differ (P = .96) between NS and corn. Steers managed with SLS at the feedlot on October 3. Upon arrival, corn steers weighed 81 lbs more (P = .006) than NS steers; CSM steers had an intermediate BW. When the cattle were deemed finished (174 days, IES; 154 days, SLS), BW did not differ between treatments (Table 2). During their respective feeding periods, SLS steers consumed 21.3 lbs of feed DM/day (pen average) and the IES steers consumed 22.5 lbs of feed DM/day (pen average). Season-long stocking and IES steers had a feed DM/gain conversation factor of 6.0 and 6.5, respectively (pen averages). Total feedlot gain was 14% greater (P < .09) for the IES steers than the SLS steers (Table 2). As a result of the SLS plus corn steers entering the feedlot at a heavier BW, corn steers tended (P < .11) to gain less weight at the feedlot than SLS plus NS or SLS plus CSM steers. Average daily gains at the feedlot did not differ (P = .44) among treatments but did reflect difference in total gain.

[1] Vigortone No. 32S®. Contained (% as-fed): 18.2% NaCl, 13.6% Ca, 7.0% P, .01% I, .0026% Se, trace minerals (Co, Cu, Fe, Mn, and Zn), 300,000 IU of vitamin A/lb, 30,000 IU of vitamin D_3/lb, and 100 IU of vitamin E/lb.

Hot carcass weight did not differ (P = .29) among treatments, but dressing percentage did (P < .01; Table 2). Steers managed with IES had a higher (P < .04) dressing percentage than SLS steers, which can probably be explained by the tendency (P < .15) of IES steers to have thicker fat cover over the carcass. There was a tendency (P < .13) for IES plus corn steer to have a larger rib-eye area (Table 2). Yield grade did differ (P = .02) by treatment. The SLS plus CSM and IES plus corn steers had the lowest yield grade, which indicates a higher percentage of lean cuts. Kidney-pelvic-heart fat, marbling code, and quality grade code did not differ (P > .20) by treatment (Table 2).

Implications

Intensive-early stocking failed to provide greater total gain / acre relative to SLS, but its production was equivalent to SLS. Corn supplementation was the best supplement with SLS, but no benefits to supplementation were detected with IES. Cattle grazed under IES management provided the best carcasses, but required a longer feed period to reach acceptable finished weights.

Table 1. The effect of grazing system and supplements on animal performance.

	Treatment					
Item	SLS-NS	SLS-Corn	SLS-CSM	IES-NS	IES-Corn	SE[a]
Initial grazing date	5/15	5/15	5/15	5/15	5/15	—
Days on pasture	140	140	140	70	70	—
BW, lb						
Beginning	478	479	478	479	482	9.0
Day 70	621[b]	654[c]	638[bc]	582[d]	579[d]	9.0
Day 140	667[b]	740[c]	702[d]	—	—	9.4
ADG, lb						
Days 0 to 70	2.0[b]	2.5[b]	2.3[b]	1.5[c]	1.4[c]	.23
Days 71 to 140	.7[b]	1.2[b]	.9[bc]	—	—	.23
Gain/acre, lb	473[b]	648[c]	560[bc]	525[bc]	490[b]	3.7
Hay production, lb of DM/acre	—	—	—	3,837	3,900	335

[a] SLS, n = three pastures of five steers/treatment; IES, n = three pastures of 10 steers/treatment.
[b-d] Means with uncommon superscripts within a row differ (P < .05).

Table 2. The effect of prior grazing system and supplements on feedlot performance and carcass quality.

	Treatment					
Item	SLS-NS	SLS-Corn	SLS-CSM	IES-NS	IES-Corn	SE[a]
Date entering feedlot	10/3	10/3	10/3	7/25	7/25	—
Days on feed	154	154	154	174	174	—
BW, lb						
Beginning	629[b]	710[c]	663[bc]	569[d]	569[d]	16.4
Ending	1,218	1,237	1,251	1,213	1,219	19.3
Total gain, lb	589[bc]	527[b]	589[bc]	645[c]	650[c]	25.0
ADG, lb	3.82	3.45	3.82	3.71	3.73	.15
Carcass quality						
Hot carcass wt, lb	721	733	750	747	750	11.1
Dressing percentage	59.2[b]	59.3[b]	59.9[b]	61.6[c]	61.5[c]	.56
Fat thickness, in	.41[bc]	.41[bc]	.38[b]	.44[c]	.44[c]	.19
Rib-eye area, in^2	12.5[a]	12.2[a]	12.9[ab]	12.8[a]	13.5[b]	.33
Kidney-pelvic-heart fat, %	2.1	2.3	2.1	2.1	2.0	.11
USDA Yield grade	2.7[bd]	2.9[c]	2.6[d]	2.8[bc]	2.5[d]	.08
Marbling code	434	411	413	412	406	22.1
Quality grade code	304	282	293	290	284	12.0

[a] SLS, n = three pastures of five steers/treatment; IES, n = three pastures of 10 steers/treatment.
[b-d] Means with uncommon superscripts within a row differ (P < .05).
[e] 300 = slight, 400 = small, and 500 = modest.
[f] 100 = Standard, 200 = Select, 300 = Choice, and 400 = Prime.