EFFECTS OF GRAZING SYSTEM AND USE OF A PASTURE-PHASE IMPLANT ON GRAZING AND FINISHING PERFORMANCE OF STEERS

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Summary

Results are presented from the first year of a 2-year study to evaluate the effects of grazing system (intensive-early stocking or IES vs season-long grazing or SLG) with or without a pasture-phase implant (Synovex-S®) on grazing and subsequent finishing performance. Compared to a SLG system, IES resulted in faster rate of gain on pasture and more beef produced per acre, although SLG resulted in greater total pasture gain per animal. Implanting improved rate of gain and increased beef per acre, particularly for IES steers. In the feedlot, IES steers gained weight faster and more efficiently than SLG steers. However, SLG steers had greater final live weights and carcass weights at a common backfat thickness. Pasture-phase implanting did not affect feedlot performance. For heavier SLG steers, final feedlot weights combined with a higher proportion of total gain being made on pasture offset their slower gains and higher cost of production. Implanting IES steers prior to grazing resulted in a numerical improvement in final feedlot weight and net return.

(Key Words: Grazing System, Finishing, Steers, Implant.)

Introduction

Intensive-early stocking (IES) of cattle on Flint Hills range prior to finishing generally improves rate of gain and gain per acre over season-long grazing (SLG), resulting in lower costs of gain. Further, IES systems improve grazing distribution and forage species composition. With heightened interest in retained ownership, custom grazing, and alliance programs, it is important to know whether the grazing system employed will affect subsequent feedlot performance and overall profitability of a combined grazing-finishing program. Also, if ownership is retained after grazing, it is important to know whether cattle should be implanted during grazing, or whether implantation should be deferred until feedlot placement. Therefore, we designed a 2-year study to evaluate the effects of grazing system (IES vs SLG) and pasture implantation on grazing performance, feedlot performance, and net return for a combined grazing-finishing program. This paper reports results from the first year (1993-1994).

Experimental Procedures

One hundred forty-four predominantly British and Continental crossbred steers (594 lb) were selected on weight and breed type uniformity from a larger group of 256 head. Steers originated from sale barns in Oklahoma City. Upon arrival, they were individually eartagged, treated for internal and external parasites, and vaccinated against IBR, PI_3, BVD and BRSV (modified live), and blackleg (4-way). Steers were fed receiving rations of either long-stem prairie hay plus a natural protein supplement or a 60% concentrate milled ration for 22 days before the trial began. Steers were blocked by previous treatment and stratified by weight into one of 24 feedlot outcome groups of six head each, prior to grazing. Each group was assigned to one of four grazing treatments in a 2x2 factorially arranged experiment: 1) IES with

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no implant, 2) IES with implant (Synovex-S®, 3) SLG with no implant, and 4) SLG with implant. Steers in the SLG system were reimplanted when IES steers were removed from pasture. Steers in the IES and SLG systems grazed 70 and 147 days, respectively. Turnout date was May 10, 1993. Steers grazed one of eight contiguous 80-acre pastures, south of Manhattan (four IES and four SLG pastures). Feedlot outcome groups were blocked within pasture to remove pasture effects. Stocking rates were 2 acres per animal for IES and 4 acres for SLG. To minimize weighing errors, all steers were fed a standardized diet of 13 lb prairie hay plus 2 lb supplement in drylot for 4 days before on- and off-pasture weights were obtained.

After grazing, steers were moved to the KSU feedlot. Management of all steers from this point until slaughter was identical. Upon arrival, steers were dewormed, vaccinated, and implanted with Synovex-S, then reimplanted after 56 days with a combination of Synovex-S and Finaplix-S®. Steers were fed a 90% concentrate diet and slaughtered by treatment group when the average backfat thickness was approximately .45 inches (118 days on feed for IES and 127 for SLG.

Results and Discussion

No grazing system × pasture-phase implant interactions occurred for any pasture or feedlot performance variable. Pasture rate of gain and beef produced per acre were higher ($P < .05$) for the IES vs SLG system (Table 1). However, because SLG steers grazed 77 days longer, they gained an additional 103 lb per head ($P < .05$) on pasture, compared to IES steers. Implanting steers before grazing increased ($P < .05$) rate of gain and beef per acre. The improvement was more dramatic for IES steers, where implanting improved rate of gain and beef per acre 16 and 15%, respectively. This was expected, because growth responses to implants increase with higher planes of nutrition or, in this case, higher forage quality for the duration of the grazing period.

In the feedlot, IES steers gained faster and more efficiently ($P < .05$) than SLG steers. Similar results have been reported from Oklahoma State University. Although feedlot placement dates differed between IES and SLG steers, differences in incoming weights likely were responsible for feedlot performance differences. Steers grazed in the SLG system weighed 91 lb more ($P < .05$) than IES steers at a similar backfat depth (average of .44 in). Pasture-phase implantation had no effect on subsequent feedlot performance.

Carcass weights averaged 66 lb heavier ($P < .05$) for SLG steers than for IES steers at similar backfat endpoints (Table 2). Pasture-phase implantation slightly reduced dressing percentage of IES steers, but slightly improving that of SLG steers (interaction; $P < .10$). Measures of carcass fatness and quality grade were unaffected by treatment.

Implanting tended to improve net return per steer for IES but not SLG steers (interaction ($P=.24$); Table 3). Despite higher pasture, interest, and feedlot feeding costs, SLG steers showed net returns per steer equal to those of implanted IES steers and greater than those of nonimplanted IES steers. The higher final weights (live or carcass basis) and the value of the added weight offset the increased production costs for SLG steers . Faster rates of gain on pasture and in the feedlot resulted in faster rates of fat deposition and, thus, lower final weights at a similar fat thickness for IES steers. The percentage of combined grazing-finishing weight gain that was achieved on pasture averaged 21.3 vs 33.3% for the IES vs SLG systems . This economic analysis will not necessarily apply to areas where steers can be grazed longer in IES systems (e.g., southern Flint Hills). Also, because twice the number of animals was grazed on the same amount of land for the IES vs SLG system, net returns per 100 acres of pasture were highest for the implanted IES steers. Therefore, IES will be particularly attractive to highly capitalized operations with limited available pasture, but SLG may be preferable for less highly capitalized operations. Range ecology and pasture management or renovation also need to be considered in the decision-making process.

Table 1. Effect of Native Range Grazing System and Pasture-Phase Implant on Grazing and Finishing Performance of Steers

	Intensive-Stocked[a]		Season-Long[a]		
Item	Control	Implant[b]	Control	Implant[b]	SE
No. Steers	36	36	36	36	
No. Feedlot Pens	6	6	6	6	
Pasture Phase					
On weight, lb[c]	594	592	597	593	3.6
Off weight, lb[c,f]	713	730	823	830	8.9
Pasture gain, lb[f]	119	138	226	237	9.2
Pasture ADG, lb[f,g]	1.70	1.97	1.54	1.62	.08
Beef/acre, lb[f,g]	60	69	56	59	2.8
Feedlot Phase					
Starting weight, lb[c]	713	730	823	830	8.9
Final weight, lb[d,f]	1133	1162	1238	1239	15.9
Daily gain, lb[f]	3.56	3.65	3.27	3.22	.10
Daily feed, lb DM	22.7	23.5	22.4	23.2	.59
Feed/gain[e,f]	6.39	6.45	6.88	7.22	.15
Combined Phases					
Total gain, lb[f]	586	618	692	698	17.3

[a]Intensive-stocked steers grazed for 70 days (2 acres/head); Season-long grazed for 147 days (4 acres/head).
[b]Implanted before the pasture phase with Synovex-S®. Season-long steers reimplanted after 70 days on pasture.
[c]Weights obtained after 4 days of equalized feeding (13 lb prairie hay plus 2 lb soybean meal/head/day) in the feedlot.
[d]Final live weights pencil shrunk 4%.
[e]Calculated and analyzed statistically as gain/feed.
[f]Grazing system effect ($P < .05$).
[g]Pasture implant effect ($P < .05$).

Table 2. Effect of Grazing System and Pasture-Phase Implant on Carcass Traits

	Intensive-Stocked		Season-Long		
Item	Control	Implant	Control	Implant	SE
Hot weight, lb[a]	722	733	789	798	10.4
Dressing %[b]	63.8	63.1	63.7	64.5	.43
Backfat, in.	.42	.42	.45	.46	.033
KPH, %	2.13	2.06	2.11	2.16	.083
Marbling Score[c]	5.25	5.19	5.62	5.26	.159
Percent Choice	72	66	71	68	

[a]Grazing system effect (P < .000l).
[b]Grazing system x pasture-phase implant (P< .l0).
[c]Slight 0=4.0, small 0=5.0, etc.

Table 3. Effect of Grazing System and Pasture-Phase Implant on Returns to Grazing-Finishing Systems

	Intensive-Stocked		Season-Long		
Item, $/head	Control	Implant	Control	Implant	SE
Total Cost[a]	818.22	825.39	879.54	887.56	
Animal cost[b]	539.58	539.58	539.58	539.58	
Receiving cost[c]	40.00	40.00	40.00	40.00	
Pasture cost[d]	37.50	38.50	75.00	77.00	
Interest @ 9%	28.34	28.34	39.78	39.78	
Feed cost[e] (feedlot)	172.80	178.98	185.18	191.21	4.62
Value[a,f]	821.26	842.14	897.78	898.09	11.52
Return, $/head[g]	$3.04	$16.75	$18.25	$10.52	$8.59
Return, $/l00 acres	$152.00	$837.50	$456.25	$263.00	

[a]Intensive-stocked vs season-long (P < .000l).
[b]$95.50/cwt (laid in) on payweight of 565 lb.
[c]Feed, medicine, veterinary, death loss, misc.
[d]Pasture cost of $13/acre plus $11.50 vs $23.00 per head for IES vs SLG systems, respectively, to cover mineral, labor, etc. Implants @ $1.00 per dose.
[e]Charged at $.065 per lb of dry matter; Intensive-stocked vs season-long (P< .02).
[f]Cash price of $72.50 for fed steers.
[g]Grazing system × implant interaction (P=.24).