Integration of Pasturing Systems for Cattle Finishing Programs: A Progress Report

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Summary

This progress report presents the findings of the first two years of a multi-year study. Each year 84 fall-born and 28 spring-born calves of similar genetic background were used to evaluate the incorporation of rotational pasturing systems into cattle finishing programs. The fall-born calves were started on test on May 7, 1996, and May 8, 1997, whereas the spring-born calves were started on test on October 1, 1996, and September 13, 1997. A total of seven treatments were imposed: 1) fall-born calves directly into the feedlot; 2) fall-born calves put on pasture and receiving an ionophore and moved to the feedlot on July 30, 1996, and July 29, 1997 in the first and second years, respectively; 3) fall-born calves put on pasture without an ionophore and moved to the feedlot on July 30, 1996 and July 29, 1997, in the first and second years, respectively; 4) fall-born calves put on pasture and receiving an ionophore and moved to the feedlot on October 22, 1996, and October 21, 1997, in the first and second years, respectively; 5) fall-born calves put on pasture without an ionophore and moved to the feedlot on October 22, 1996, and October 21, 1997, in the first and second years, respectively; 6) spring-born calves put on pasture and receiving an ionophore and moved to the feedlot on October 22, 1996, and October 21, 1997, in the first and second years, respectively; and 7) spring-born calves put on pasture without an ionophore and moved to the feedlot on October 22, 1996, and October 21, 1997, in the first and second years, respectively. Cattle receiving an ionophore on pasture gained more rapidly; however, cattle without access to an ionophore gained more rapidly in drylot thus negating the advantage obtained on pasture. Overall daily gains and feed conversions in drylot only, improved with increasing numbers of days fed in drylot; however, this may not be very cost effective. At similar end weights no real differences were observed in yield grades among the treatments; however, for fall-born calves the percentage grading Prime and Choice was higher for cattle fed longer in drylot.

Introduction

A system for finishing beef cattle involving a rotational grazing system in conjunction with a conventional feedlot is presented. Pasture consisting of highly erodable land was used, making soil conservation and input cost reduction highly important considerations. Thus the purpose of this study is to integrate pasturing systems with conventional drylot feeding systems and compare the system in terms of feeding performance, carcass characteristics and economics.

Materials and Methods

The study was begun in May, 1995, at the Western Iowa Research and Demonstration Farm at Castana, Iowa, with the establishment of a smooth bromegrass pasture. The purpose was to examine the feasibility of using a pasturing system in conjunction with drylot feeding as a means of improving land usage and the overall economics of beef production. Each year eighty-four fall-born calves, purchased from the Stuart Ranch near Caddo, OK, were used in the initial phase of the study. The calves were given their calfhood vaccinations at the ranch. They arrived at the research farm on April 17, 1996, in the first study and April 15, 1997, in the second study, after 12 hours of transport. The calves were given ground, mid-bloom alfalfa hay on arrival until May 7, 1996, and May 8, 1997, in the first and second year study, respectively. Initially the cattle received one gram per head per day of chlortetracycline as a health precaution. This was fed at the rate of .25 lb per animal of four gram per lb AS-700® crumbles, top-dressed on the hay each morning. Amprolium® was added to the water source for two weeks after arrival of the calves to aid in controlling coccidiosis. The steers, averaged 367 and 350 lb in 1996 and 1997, respectively, and were identified with an ear tag, implanted with Compudose®, injected with Iovomec® plus Flukocide®,and randomly allotted into 12 groups of seven animals each on May 7, 1996, and May 8 1997, prior to being placed on test.

Each group of steers was assigned at random to one of five treatments. There were four grazing treatments; steers on each treatment were provided supplement blocks either with or without monensin sodium ionophore. One pasture treatment involved placing 28 steers on cool season grass pasture on May 7, 1996, and May 8, 1997, respectively, 14 with and 14 without ionophore, and then moving them to the feedlot July 30, 1996, and July 29 1997, respectively, to be fed the finishing diet during the remainder of the trial. The second 28 head of steers were placed on cool season grass pasture also on May 7, 1996, and May 8, 1997, respectively, 14 with and 14 without ionophore, and then moved to the feedlot on October 22, 1996, and October 21, 1997, respectively.

A total of 28 control steers (seven head per pen) were placed directly into the feedlot after processing and gradually adapted to an 82 % concentrate diet containing whole shell corn, ground alfalfa hay, a natural protein, vitamin and mineral supplement containing ionophore, and molasses. When steers fed the finishing diet attained an average weight of 800 lb, the supplement was switched from natural protein to an urea-based 40 % crude protein, vitamin, and mineral premix. These feedlot groups were implanted with Revelor® on October 22, 1996, and October 21, 1997, respectively, approximately 100 days prior to slaughter. The remaining groups were also reimplanted in the same manner in the feedlot phase when, based on live weight and live weight gains, they were estimated to be 100 days from finishing.

The remaining two treatments involved 28 spring-born calves from the same ranch processed in the same manner as the fall-born calves. These calves arrived September 17, 1996, and September 15, 1997, from Oklahoma and were identified with an ear tag, implanted with Compudose®, injected with Ivomec®, randomly allotted into four groups of seven animals each on October 1, 1996, and September 30, 1997, respectively, and put on pasture. They were moved to the feedlot October 22, 1996, and October 21, 1997, respectively, and fed the finishing diet for the remainder of the trial.

On pasture, those cattle receiving ionophore grazed together as a group (14 steers), and those not receiving ionophore grazed together as a separate group. Each grazing group had access to one paddock at a time, approximately 1.7 acres in size. There were 16 paddocks each separated by two strands of electrified steel cable attached to metal "T" posts. Including cattle lanes, which were grazed as needed, the total pasture available was 29.85 acres. Cattle were moved on the basis of forage availability. Initially, the cattle were not capable of consuming adequate forage to match the growth of the forage in all the paddocks, and they were moved every three or four days to a new paddock. In the first year three paddocks were harvested as grass hay during the second week of June. Because the grass grew at a slower rate later in the season and the cattle were able to consume more forage per day, they were moved every two days to a different paddock. Nitrogen fertilizer was added to the pasture in two applications; the first 100 lb per acre of nitrogen was applied in late April and an additional 80 lb per acre was applied in mid-August.

Feedlot steers were housed in pens with concrete floors and a shelter at the north end. Steers were fed in fence-line concrete bunks and had access to automatic waterers. Feed allotments were determined daily prior to the morning feeding. Feed samples were collected twice per week for dry matter determination. Alfalfa hay samples were collected weekly for determination of neutral detergent fiber (NDF) and acid detergent fiber (ADF) content

All steers were weighed individually every 28 days during the trial. When pens of cattle reached about 1,150 lb average live weight, they were processed at IBP in Denison, IA. After a 24-hour chill, 12th rib fat thickness and ribeye area were measured on the left half of each carcass. Carcass grades were recorded as determined by the USDA Meat Grading Service personnel.

Statistical Analyses

The experimental unit is a group of seven steers. There are seven treatment combinations. Six with two replications and one with four replications. The analysis will take the form of a one-way analysis of variance with six degrees of freedom for treatments and 9 degrees-of-freedom within treatments or experimental error.

Results and Discussion

Data for performance are presented in Table 1. Cattle receiving ionophore on pasture tended to perform better than those not receiving ionophore. This difference became especially evident later in the season when forage quality and quantity decreased. When cattle were moved to drylot from pasture, cattle not receiving ionophore on pasture performed better than those receiving ionophore on pasture. In the feedlot, cattle brought from pasture to the feedlot had lower gains than those cattle started directly in the feedlot, with the exception of spring-born calves moved to the feedlot on October 22, 1996, and October 21, 1997, respectively, that had not received ionophore on pasture. In terms of gain throughout the study, the cattle started directly in the feedlot had higher gains than cattle brought from pasture to feedlot at various times. Also, for the duration of the study, cattle not receiving ionophore on pasture had almost identical gains to those receiving ionophore on pasture. Average daily dry-matter intake in the feedlot was lowest for cattle started directly in drylot and highest for cattle moved to the feedlot on July 30, 1996, and July 29, 1997, respectively. Feed efficiency was best for cattle started directly in the feedlot, and cattle not receiving an ionophore on pasture had better feedlot feed efficiency than those receiving an ionophore on pasture.

Table 2 provides carcass data. In general, cattle placed directly in drylot had lower dressing percentages, smaller loineye areas, less KPH fat, and more backfat. Cattle receiving an ionophore on pasture tended to have more backfat. These findings did not, however result in poorer yield grades. The percentage of cattle grading Prime and Choice was higher for fall-born calves and calves in the fall-born groups that spent more time in drylot.

Implications

The results of this two-year study show that using an ionophore on pasture is an effective way to increase rate of gain, although this advantage was lost during the drylot finishing period. Yield grades were not greatly influenced by treatment; quality grades for fall-born calves were very

acceptable regardless of treatment, and spring-born calves had slightly lower quality grades than anticipated, even though processed into beef at the same end weight as fall-born calves. Additional trials are in progress to corroborate these findings and to provide data for complete economic analyses of these feeding systems.

Table 1. Performance of cattle both in feedlot and on pasture.

Treatment	Pasture gain (lb per day)	Feedlot gain (lb per day)	Gain throughout experiment (lb)	DMI (in feedlot)	FE (in feedlot)
Fall-born calves					
Direct to feedlot		2.89	2.89	17.75	6.16
To feedlot July 30, 29					
Ionophore	1.87	2.71	2.47	18.54	6.89
No ionophore	1.53	2.76	2.48	18.54	6.65
To feedlot Oct 22, 21					
Ionophore	1.72	2.55	2.17	18.48	7.36
No ionophore	1.60	2.64	2.17	18.48	7.11
Spring-born calves					
To feedlot Oct 22, 21					
Ionophore	1.10	2.83	2.66	18.39	6.45
No ionophore	0.52	2.96	2.70	18.39	6.24

Table 2. Carcass characteristics of cattle.

Treatment	Final weight (lb)	Dressing %	Loineye area (inch^2)	Back fat (inch)	KPH fat %	Yield grade	Quality grade (% Pr and Ch)
Fall-born calves							
Direct to feedlot	1171	60.5	12.18	0.53	2.22	2.64	96
To feedlot July 30, 29							
Ionophore	1166	61.6	12.51	0.53	2.39	2.65	100
No ionophore	1180	61.8	12.71	0.47	2.46	2.63	100
To feedlot Oct 22, 21							
Ionophore	1158	61.5	12.16	0.45	2.27	2.31	88
No ionophore	1155	61.1	12.50	0.42	2.20	2.25	82
Spring-born calves							
To feedlot Oct 22, 21							
Ionophore	1158	61.4	12.61	0.49	1.98	2.19	65
No ionophore	1159	61.7	12.54	0.43	2.53	2.33	78