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

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Summary

This progress report is an introduction to a study to evaluate the incorporation of rotational pasturing systems into cattle finishing programs. Because the first year is still in progress and the first trial is not complete, few data are available. However, there is a suggestion that feeding an ionophore to young calves on pasture may result in improved daily gains.

Introduction

In this report a system of finishing beef cattle utilizing a rotational grazing system in conjunction with a conventional feedlot is presented. The pasture exists on land classified as highly erodible, making soil conservation, as well as input cost reduction, an important consideration.

Materials and Methods

This study was begun May, 1995 at the Western Iowa Research and Demonstration Farm at Castana, Iowa, with the establishment of a smooth bromegrass pasture. The purpose of the study was to examine the feasibility of using a pasturing system prior to placing cattle in the feedlot as a means of improving land usage and the overall economics of beef production. Eighty-four fall-born calves purchased from the Stuart Ranch near Caddo, OK, were used in the initial phase of this study. The calves were given their booster shots at the ranch and injected with Ivomec™ plus Flukocide. They arrived at the research farm on April 17, 1996, after 12 hours of transport. The calves were given ground mid-bloom alfalfa hay on arrival until May 8, 1996, when they were started on test. 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 control coccidiosis. The steers, weighing 367 lb on average, were identified with an ear tag, implanted with Compudose™, and randomly allotted into 12 groups of seven animals each on May 7, 1996, prior to being placed on test.

Each group of steers was assigned at random to one of five treatment combinations. There were four grazing treatments; steers on each treatment were either provided supplement blocks with Monensin Sodium ionophore or without ionophore. The first pasture treatment involved placing 28 steers on the cool season grass pasture May 7, 1996, with or without ionophore, and then moving them to the feedlot July 30, 1996, to be fed the finishing diet the remainder of the trial. The second pasture treatment consisted of placing 28 steers on the cool season grass pasture May 7, with and without ionophore, and then moving them to the feedlot October 22, 1996, to be fed the finishing diet the remainder of the trial. The third 28 head of steers were placed directly into the feedlot (seven head per pen) and fed the finishing diet for the duration of the feeding period.

The final two treatments involved placing 28 spring-born calves, from the same source and processed in the same manner as the fall born calves, on the cool season grass pasture October 1, 1996, and moving them to the feedlot October 22, 1996, to be fed the finishing diet the remainder of the trial. This group arrived September 17, 1996, from Oklahoma and were identified with an ear tag, implanted with Compudose™, injected with Ivomec™, and randomly allotted into four groups of seven animals each on October 1, 1996, and put on pasture.

The 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 to control dust. After steers being fed the finishing diet attained an average weight of 800 lb, the supplement was switched from the natural protein to an urea-based 40% crude protein, vitamin and mineral premix. Control feedlot groups were reimplanted with Revalor™ on October 22, 1996, approximately 100 days prior to slaughter. The remaining groups will also be reimplanted in the same manner when, based on live weight and live weight gains, they are estimated to be 100 days from finishing the feedlot phase.

On pasture, those cattle receiving ionophore grazed together as a group (14 to 28 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 each. 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. 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.

Estimates of available forage live dry matter were recorded with the aid of a sward stick device (Russell, 1992). Measures of sward height were recorded before and after cattle were allowed to graze each paddock. The height of the forage was related to available live dry matter by sampling several sites selected at random in the pasture throughout the grazing period. First, forage height was determined with the sward stick. Then a one square foot area directly under the sward stick was clipped to within 8 cm of the ground (Baker et al., 1985), separated into live and dead material, and weighed. All samples of pasture obtained on a particular day were combined, mixed thoroughly, and sub-sampled three times for dry matter determination. Live dry matter per acre was a product of: live forage sample wt (lb) x dry matter percentage x 43,560 sq ft. per acre.

Control 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 steers 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 (Goering and Van Soest, 1970; Van Soest et al., 1991).

Steers were weighed individually every 28 days during the trial. Average daily gain and feed conversion will be determined by adjusting each steer's final live weight to a constant dressing percentage of 61.5%. When pens of cattle reach about 1,200 lb average live weight they will be processed at IBP in Denison, IA. After a 24-hour chill, 12th rib fat thickness and ribeye area will be measured on the left half of each carcass. Carcass grades will be 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 13 degrees-of-freedom for units within treatments (experimental error).

Results and Discussion

Feedlot daily gains for control cattle through October 22, 1996, averaged 2.92 lb (Table 1). Cattle either fed ionophore or not fed ionophore on pasture and then moved to the feedlot July 30, 1996, had similar combined weight gains of 2.27 lb. The cattle grazed from May 7 to October 22 show an advantage for the ionophore supplemented cattle (1.88 vs 1.73 lb per day). The spring born calves, provided pasture for three weeks, displayed an advantage for the ionophore fed cattle (1.96 vs 1.31 lb per day).

Table 1. Average daily gains of cattle both in feedlot and on pasture - trial one.

Treatment	Pasture Gain (lb per day)	Feedlot Gain (lb per day)	Gain through Oct. 22, 1996 (lb per day)
Fall born calves			
Direct to feedlot		2.92	2.92
To feedlot July 30			
Ionophore	1.81	2.74	2.27
No ionophore	1.77	2.76	2.27
To feedlot Oct. 22			
Ionophore	1.88		1.88
No ionophore	1.73		1.73
Spring born calves			
To feedlot Oct. 22			
Ionophore	1.96		1.96
No ionophore	1.31		1.31

Implications

Very preliminary observations suggest a gain advantage associated with feeding ionophore to calves consuming cool-season grass pastures.

References

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