PROFITABILITY OF CATTLE: EFFECTS OF AGE, DATE ON FEED AND CORN PROCESSING

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Story in Brief

Yearling steers (117 hd) and fall-born calves (112 hd) were used to determine the effects of age, date on feed (July vs September) and grain processing in the feedlot (dry rolled vs steam flaked) on the economics of production. Yearlings entering the feedlot in July had grazed tallgrass prairie for 100 days while calves entering in July were weaned, backgrounded for 30 days and placed directly on feed. In September, yearlings had grazed for 156 days while calves had grazed for 56 days during late summer. Because calves were fed an average of 21 days longer than yearlings, calves had higher total feedlot costs. Carcass value was lower for calves and resulted in negative returns. In spite of negative returns, calves had lower feedlot cost of gains. The underlying reason for negative returns for the calves was light carcasses and a lower percentage of carcasses in the choice grade, perhaps due to insufficient days on feed. Cattle with longer backgrounding periods had higher grazing costs but lower feedlot costs, due to less days on feed, which resulted in no difference in total costs or profitability. Corn processing had no significant effects on calculated costs or value, but steam flaking tended to improve carcass value and feed efficiency, and thereby profit and feedlot cost of gain.

(Key Words: Calves, Yearlings, Grazing, Feedlot, Steers.)

Introduction

Many different backgrounding programs are used in the beef cattle industry. Consequently, cattle enter the feedlot and subsequently the packing plant with differences in age, previous ration and length of time on feed. Time on feed in turn depends on length of previous backgrounding or grazing. If the industry moves to a value-based marketing system, value will be assessed primarily on carcass merit. Additionally, different backgrounding programs are associated with a variety of costs including pasture, feed, and interest costs, as affected by length of ownership. If producers wish to benefit from a value based selling system, they must understand how genetic and environmental (i.e., management) factors effect carcass value and economics. The objectives of this research were to determine how chronological age (calves vs yearlings),

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previous background or grazing program and corn processing (dry-rolled vs steam-flaked) would affect carcass value and costs of production.

Materials and Methods

Data from 117 yearling steers and 112 fall-born calves were used to determine the effects of age, date of entry into the feedlot (length of grazing), and corn processing method on feedlot economics and total production economics. Spring-born crossbred yearling steers (British and British x exotic) from western Kansas were received at the Pawhuska research station (Pawhuska, OK) in March 1993. The yearlings had grazed wheat pasture for 30 to 60 days prior to shipment. Upon arrival, cattle were weighed, ear tagged, treated with Ivermectin® (MSD Ag Vet Merck, Division of Merck & Co, Inc. Rahway, NJ) and vaccinated against clostridial organisms (sc), IBR, PI3, BRSV and Leptospirosis (im). During the receiving period, cattle were fed 2 pounds per day of a 38% CP supplement and had ad libitum access to prairie hay and water. After the 28-day receiving period, yearlings were re-vaccinated and placed on tallgrass prairie pastures. On July 27, after 100 days of grazing, the yearlings were weighed and assigned randomly either to continue grazing for the remainder of the season (SEPT) or placed in a feedlot (JULY).

Fall-born weanling calves (exotic and exotic x Brahman) were purchased in June from northern Texas. The 28-day backgrounding procedure was similar to that used for yearlings. After the receiving period, calves were assigned randomly to either graze with the remaining yearlings until September (SEPT) or to go directly to the feedlot (JULY) without grazing. On September 21, the remaining calves and yearlings on pasture were shipped to the feedlot. All cattle were implanted at 60 day intervals with Synovex S® (Syntex, West Des Moines, IA) until they were about 100 days from slaughter, at which time they were implanted with Revalor® (Hoechst-Roussel Agri-Vet, Somerville, NJ).

Upon arrival at the feedlot, cattle within both ages and backgrounding regimes were stratified by weight into heavy, medium and light weight replications and assigned randomly to pens. Within each age, background and weight replication, pens were assigned randomly to either a steam flaked (SF) or dry rolled corn (DR) diet. A total of 24 pens (1 pen per age, background, diet replication) was used. Diets were identical except for the corn processing method. Diet and nutrient composition were described by Hill et al. (1993).

Returns were calculated by subtracting total cost from total value. Total value was calculated by using a base carcass price of $112.80/cwt with a $7.83/cwt offal credit, a $5.00/cwt discount for select carcasses, a $11.13/cwt discount for yield grade 4's, a $12.50/cwt discount for carcasses less than 550 lb or greater than 900, and a slaughter cost of $25.00/steer. Total cost included

purchase price, pasture cost, feed cost and interest. The purchase price, determined from the average Oklahoma City price for the respective weight and month in which the cattle were purchased, was $105.57/cwt and $108.97/cwt for yearlings and calves, respectively. Pasture cost was $.25/lb of gain on pasture and interest rate was charged at 9%. Feedlot cost included ration costs of $120.25 and $123.75 (DM basis) for DR and SF, respectively, and a daily cost of $.40/hd which included feed markup, yardage and interest.

This study was a 2 x 2 x 2 factorial arrangement of treatments with two ages, two backgrounds and two diets. Data were analyzed by the GLM procedure of SAS (1988) with the main effects being age, starting date and corn processing plus interactions of these three factors.

Results and discussion

Age. Effect of age on production economics are summarized in Table 1. Total backgrounding cost did not differ (P>.10) between calves and yearlings. Total backgrounding cost includes both purchase price and pasture cost. The yearlings grazed longer and had a greater pasture cost, but the calves were purchased at a heavier weight and a higher price/cwt. Total feed cost in the feedlot tended to be greater (P=.10) for calves than yearlings due to the longer feeding period. Total feedlot cost, which includes feed, yardage and interest, was greater (P=.05) for calves, but the total cost of production of calves was not significantly higher (P=.22) than the total cost of production of the yearlings. However, the total carcass value was $55.24 less (P<.01) for calves because a 27 lb lighter carcass weight, explains $30.00 of the difference. Had the calves been fed longer, this difference may have been smaller. The lower carcass value and slightly higher feedlot cost associated with the calves resulted in less (P<.01) profit. Note that even though the calves lost money, they had lower (P<.05) feedlot cost of gain ($.48 vs $.51), due to superior feed efficiency. The total cost of gain from purchase to slaughter was similar for yearlings of different backgrounds at $.47, but was $.45 and $.48 for JULY and SEPT calves, respectively. The value calculated for calves and yearlings represents the value of the cattle from a packer and producer standpoint if the cattle were sold on a grade and yield basis.

Today, most cattle are still sold on a live basis. It is doubtful that visual appraisal by a packer buyer would distinguish the value difference between the calves and yearlings in this trial. Had the cattle been sold on a live basis, calves probably would have received the same slaughter price/cwt of live weight as the yearlings; reducing the advantage of yearlings to $31.86, and to no advantage if adjusted to an equal carcass weight. Gill et al. (1993) in a study comparing animals of different ages and backgrounds, showed calves to be significantly more profitable due to superior efficiency and a greater percentage

of choice carcasses. Although the calves in the present study were less profitable it appears this was due primarily to underfeeding in an attempt to fit calves into the seasonally high live April market.

Starting date and grain processing. Effects of starting date on economics are summarized in Table 2. Backgrounding cost was greater (P=.13) for SEPT than JULY cattle due primarily to the extended grazing period of SEPT cattle. Feed cost and total feedlot cost were greater (P<.07 and P<.05, respectively), for JULY cattle because they spent a longer time in the feedlot. No other measures were affected by starting date. Although, grain processing (Table 3.) had no significant effects on any calculated costs or value, numerical benefits for SF were seen for total value, due to a slightly greater carcass weight and 5 % more choice carcasses (Hill et al. 1995), and thereby in profit and in cost of gain due to superior feed efficiencies.

In summary, management factors such as cattle age, backgrounding and grain processing can have varied effects on cattle carcass traits (Hill et al. 1995) as well as costs of production. To maximize profit in a value-based marketing system producers must be aware of these variables and make decisions accordingly. While calves in this study were slightly underfed, the data still provides relevant insight into the economics of production and suggests that cattle of diverse type can be profitably managed. Additionally, it should be noted this study used a constant set of economic parameters for all cattle, but in practice different management practices may be utilized to take advantage of the seasonality of cattle prices as well as changes in grain price. These factors add a new dimension to the economic considerations of cattle management and should not be ignored.

Literature Cited

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Table 1. Economic data for calves and yearlings.

Item	Calves	Yearlings	SEM
Total cost, $	856.36	835.13	11.93
Backgrounding cost, $	623.09	619.69	12.95
Purchase cost	607.31[a]	546.31[b]	12.08
Grazing cost	11.44[a]	54.98[b]	1.77
Total feedlot cost, $	233.26[a]	215.43[b]	5.20
Feed cost	172.80[c]	163.50[d]	3.77
Yardage	60.46[a]	51.93[b]	1.61
Total value, $	805.37[a]	860.61[b]	11.63
Profit, $/hd	(50.99)[a]	25.47[b]	10.23
Cost of gain, $/lb			
Feedlot	.48[a]	.51[b]	.008
Total[z]	---	---	.006

[a,b] Means with different superscripts differ (P<.05).
[c,d] Means with different superscripts differ (P<.10).
[z] indicates a (P<.15) age x datein interaction. Total cost of gain were July calves was $.45, Sept calves $.48, July and Sept yearlings $.47.

Table 2. Economic data for cattle entering the feedlot in July (JULY) or September (SEPT).

Item	July	Sept	SEM
Total cost, $	839.15	852.34	11.93
Backgrounding cost, $	606.84	635.94	12.95
Purchase cost	575.26[a]	578.28[b]	12.08
Grazing cost	24.36[a]	42.06[b]	1.77
Total feedlot cost, $	232.30[a]	216.40[b]	5.20
Feed cost	173.23[c]	163.06[d]	3.77
Yardage	59.06[a]	53.33[b]	1.61
Total value, $	829.38	836.59	11.63
Profit, $	(9.76)	(15.75)	10.23
Cost of gain, $/lb			
Feedlot	.49	.50	.008
Total	.46	.47	.006

[a,b] Means with different superscripts differ (P<.05).
[c,d] Means with different superscripts differ (P<.10).

Table 3. Economic data for cattle fed rations containing dry-rolled (DR) or steam-flaked (SF) corn.

Item	DR	SF	SEM	OSL[b]
Backgrounding cost	621.87	620.91	12.95	.95
Feed cost	167.69	168.61	3.77	.86
Total feedlot cost	223.89	224.81	5.20	.90
Total cost	845.78	845.71	11.93	.99
Total value	827.47	838.50	11.63	.51
Profit	(18.30)	(7.21)	10.23	.45
Feedlot cost of gain	.50	.49	.008	.32
Total cost of gain	.47	.46	.006	.38

[b] OSL = observed significance level.