STARTING AGE: EFFECTS ON ECONOMICS AND FEEDLOT CARCASS CHARACTERISTICS OF STEERS

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Story in Brief

At approximately 3 months of age, 140 steers of uniform age and genotype were allotted to one of five management schemes: early weaned (EW; early weaned and placed into a feedlot at 3.5 months); normal weaned (NW; weaned and placed in a feedlot at 7.9 months); wheat pasture (WP, weaned at normal age but grazed on wheat pasture for 112 days prior to placing in a feedlot at 11.6 months); short grazed (SG; weaned at normal age but wintered on dry native range and then grazed on early intensively managed native range for 68 days prior to placement in a feedlot at 15.4 months); long grazed (LG; same as SG but grazed native range for 122 days prior to placement in a feedlot at 17.4 months). Starting feedlot weights were 314, 540, 765, 848, and 918 pounds. To reach a similar fat thickness endpoint (0.5 inches), younger steers had to be fed for longer periods in the feedlot (EW=287 days, NW=198 days, WP=134 days, SG=123 days, and LG=101 days). Slaughter weights, adjusted to a dressing percentage of 64%, were 1154, 1178, 1259, 1259, and 1222 pounds. The percentage grading choice or above was 80, 68, 71, 89, and 75. Younger cattle were fatter at slaughter based on either yield grade or carcass specific gravity. Because the younger cattle reached slaughter weight earlier in the year, they sold for a premium. Based on 10-year mean prices, profit per head would have been $143.11, $60.73, $.83, -$.92 and -$20.48 for the five ages, respectively. Growing or grazing cattle prior to placing them in a feedlot increased carcass weight and carcass leanness but reduced profit because of market timing.

(Key Words: Steers, Age at Slaughter, Carcass Traits.)

Introduction

Consumers in the 1990's are seeking leanness and consistency in eating satisfaction. Currently, the U.S. quality grade standards for beef categorize carcasses from cattle ranging in chronological age from approximately 9 to 30

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months of age in the same maturity group. Thus, despite a range of approximately 21 months of age at slaughter, carcasses from these cattle have the same minimum marbling requirements to attain a given quality grade. Therefore, the overall objective of this study was to examine the effect of age at slaughter on qualitative and quantitative carcass traits and to answer the following question. Are carcasses from youthful (approximately one year of age) feedlot cattle more consistent in tenderness than carcasses from older (approximately two years of age) feedlot cattle? Accordingly, we used the current management technology employed in finishing calf-fed Holsteins as well as regional backgrounding options to produce cattle that ranged in slaughter age from 12 to 21 months. Production economics were also monitored during the growing and feeding phases of this study. Hence, a secondary objective was to compare the economics of producing slaughter steers from various types of production systems used in Oklahoma.

Material and Methods

Growing systems and feeding methods are described in another paper in this report. Table 1 briefly presents the background of the 5 groups of cattle. All calves were from crossbred Angus dams and were sired by Angus bulls but were from two different ranches in Oklahoma hereafter designated as A and G. Cattle from G tended to have larger frames.

Steers were slaughtered when the average steer in each 7-head pen reached 0.50 in of subcutaneous fat as appraised visually. Prior to slaughter,

Table 1. Background and characteristics of age treatments.

Treatment	Early wean (EW)	Normal wean (NW)	Wheat pasture (WP)	Early intensive (SG)	Season long (LG)
Grazing	None	None	Wheat	Native grass	Native grass
Number head	28	28	28	28	28
Weaning age, mo	3.5	7.9	7.9	7.9	7.9
Feedlot entry					
Age, mo	3.5	7.9	11.6	15.4	17.4
Weight, lb	314	540	765	847	918
Days fed	287	198	134	123	101
End wt,lb[a]	1154	1178	1259	1259	1222

[a]Calculated as hot carcass weight/.64.

steers were fasted for approximately 12 hr, weighed and transported to either the OSU Meats Lab or a commercial plant. Carcasses were chilled 24 hr and assigned quality and yield grades. Left sides were transported to the OSU Meats Lab where specific gravity was measured and sides were fabricated into primal and trimmed sub-primal cuts and weighed with 1.00, .50, and .25 inches of fat cover.

Economic data were calculated using the livestock enterprise budget design described by Kay (1986). Cattle performance data were used to construct typical budgets for each feeding trial in the study. Input and sale prices, feed and interest costs (USDA, 1991) for the past 10 years were used in the budgets to compare profit or loss, break-even cost, feed cost of gain and total cost of gain over time. Carcass prices were reported on the USDA blue sheet for the sale day of each pen of cattle.

Specific statistical contrasts included a comparison of EW and NW with all other steers, NW versus grazed steers (WP, SG & LG), EW versus NW, WP versus steers that grazed native range (SG & LG) and SG versus LG to test effects of length of native pasture grazing. The main effects are presented except when a ranch source by treatment interaction was detected. Such interactions are discussed in the text.

Results and Discussion

Slaughter traits are presented in Table 2. Hot carcass weights tended to be less for EW steers and for cattle that went directly to the feedlot after weaning (NW) than for cattle that were carried through a backgrounding program. An interaction between cattle source and treatment was detected for carcass weight in NW, WP, and SG. With NW, the larger framed G steers tended to have heavier carcasses, whereas following wheat pasture grazing, the smaller framed steers from the A source had heavier carcasses. Short grazed steers from the G source had heavier carcasses than A steers, probably because they had grazed higher quality forage than A steers. Dolezal et al. (1983) indicated that slaughter weight and carcass weight generally increase with frame size, but backgrounding may alter this relationship.

Skeletal maturity tended to be least for calves slaughtered in EW. Long grazed steers had more advanced skeletal, lean and overall maturity (A^{60} vs. A^{49}) than steers that grazed for a shorter time period. The LG steers were 5 months older than the average for other groups. Lean maturity was lowest for steers placed in the feedlot after weaning than for cattle that were similar backgrounded. Presumably, lean maturity was similar because these cattle were fed a high energy diet longer. Prior et al. (1977), Harrison et al. (1978) and Schroeder et al. (1980) have reported that more days on feed and a higher dietary energy level caused lean texture to be finer and brighter.

Table 2. Carcass characteristics stratified by age treatments.

Treatment	EW	NW	WP	SG	LG
Hot carcass					
weight, lb[a,b]	738	754	805	806	781
Maturity[f]					
Skeletal[b,d]	A45	A59	A51	A39	A60
Lean[a,c,d]	A34	A34	A46	A37	A46
Overall[d]	A40	A46	A49	A38	A53
Marbling[g]	Sm40	Sm19	Sm22	Sm49	Sm32
REA, sq in	12.0	12.4	12.5	12.8	12.8
REA, sq in/cwt	1.64	1.64	1.56	1.59	1.65
Fat cover, in[e]	.61	.56	.58	.57	.51
KPH, %[d,e]	2.57	2.38	2.25	2.39	1.93
Yield grade[e]	3.4	3.3	3.4	3.3	3.0
Marbling score[a]	439	419	422	449	432
Percent choice	80.2	67.9	71.4	89.3	75.0

[a] Grazed differs from direct to feedlot ($P<.05$).
[b] Early weaned differs from normal weaned ($P<.05$).
[c] Wheat pasture differs from grass background ($P<.05$).
[d] Early intensively grazed differs from season long grazed ($P<.05$).
[e] Interaction of ranch of origin and treatment ($P<.05$).
[f] "A"=approximately 9-30 months of chronological age at slaughter (USDA, 1989).
[g] Small = 400-499.

Marbling score and percent choice carcasses were not significantly different among treatments although quality grade tended to be lower in the normal weaned calves that were slaughtered at 14 months. This may be a reflection of some physiological change that reduced the tendency for these cattle to express marbling well.

Differences among the groups in adjusted fat thickness, rib eye area, percent of kidney, pelvic, and heart fat, numerical yield grade and percent yield grade 4's were not significant, but a cattle source treatment interaction was detected. The early weaned steers at slaughter that were smaller framed (A) had greater fat thickness than the larger framed steers (G: .59 versus A:.54 inches). This difference in fat thickness illustrates the need to top off early weaned calves because they can become over-finished. Smaller framed steers (A) in the EW group also had more KPH than G steers, probably associated with an increased degree of finish at slaughter. These same cattle had larger rib eye areas (13.0 versus 12.0 sq. in). A similar trend was noted when averaged across all background groups although the difference was greater for the EW group. This indicates that frame size probably has a greater impact on carcass composition of younger than of older cattle. Combined into yield grade, the smaller framed (A) steers in the EW group at slaughter had a higher yield grade than G steers (3.92 versus 3.07) all attributable to greater fat thickness. Within EW, 50% of the smaller framed steers (A) were yield grade 4 or above compared to the G group at 7%. Although steers must be fed to attain a desirable quality grade, early weaned calves may become over-finished if not closely managed. It seems more difficult to detect excessive finish in early weaned feedlot steers.

Table 3 presents economic returns to a cattle feeder based on the live cattle performance observed in this experiment. Because cattle prices vary seasonally and yearly, we used mean prices on respective sale dates averaged over the past 10 years rather than specifically using the year that these cattle were fed. Because these calves were born in the spring, sale dates were chosen on that basis. Economics may have differed had calves been born during other seasons of the year.

Based on ten year average prices and production costs including expected death loss, the steers in EW returned the highest profit to the feeder with a profit of $143.11/head. Return on LG cattle was lowest at -$20.48/head. This difference is due to timeliness of marketing (finished EW cattle were sold in April when fed cattle prices generally peak). The finished WP cattle were marketed in late July, when the fed cattle market historically is low. The WP cattle returned only $.83/head profit. Total cost of gain based on yardage and feed, was lowest ($.47/lb) for EW while LG steers had the highest cost of gain ($.74/lb). Short grazed cattle had the highest break-even cost ($80.46/cwt). Break-evens for cattle grazed on WP were the most erratic over the ten year

Table 3. Live cattle economics stratified by age treatments.

Trait	EW	NW	WP	SG	LG
Break-even $/cwt	$66.20	71.95	77.35	80.46	79.98
Sale Price $/cwt	$81.50	78.00	72.00	72.00	72.00
Live Return	$940.51	918.84	906.48	907.20	879.84
Total Cost of Gain	$0.47	0.51	0.56	0.66	0.74
Profit/Loss $	$176.62	71.22	-67.36	-106.56	-97.54
Avg	143.11	60.73	0.83	-0.92	-20.48
Max	206.13	185.07	75.15	88.18	92.93
Min	68.07	-1.26	-95.05	-106.56	-97.54
Std Dev.	39.45	55.74	58.84	49.90	53.48

period due to fluctuations in the July live cattle price. Prices were most stable for the EW cattle due to stability of the April live cattle price. LG cattle had the most cyclic pattern when comparing break-evens to ten years of December live cattle prices (Figure 1).

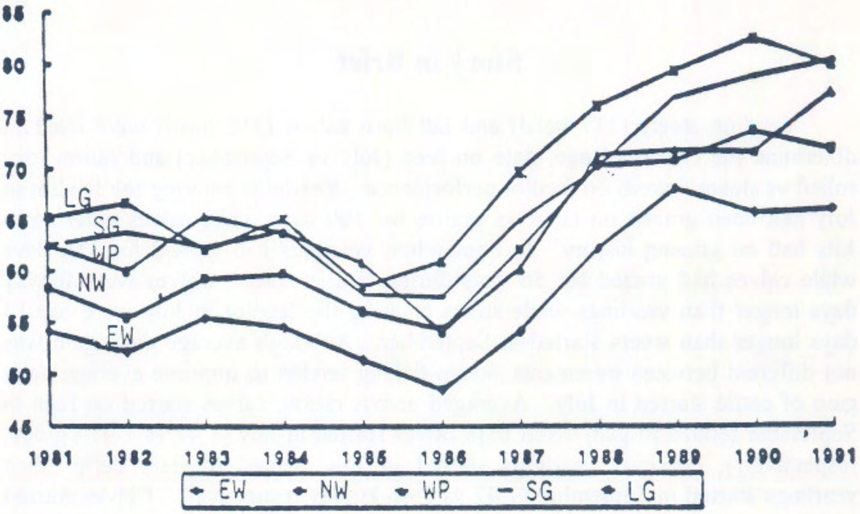

Figure 1. Five treatment break-evens for ten years.

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