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EFFECT OF EARLY WEANING ON FEEDLOT PERFORMANCE AND CARCASS CHARACTERISTCS OF HIGH GROWTH POTENTIAL FEEDER CALVES

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Summary

Steer and heifer calves produced at Ft. Meade were used to evaluate early weaning and accelerated feeding as a management tool when retaining ownership of calves. Calves were weaned at 5 1/2 (EW) or 7 mo (NW) of age and started immediately on a 60% grain feeding program. Slaughter dates represented mean calf ages of 385 or 425 days and days on feed ranged from 179 to 257 days. Range conditions were good and early weaning had little effect on calf weight at any point in the feeding period. Feeding high grain diets to EW calves did not have any detrimental effects on feedlot performance when compared to NW. Early weaned calves produced carcasses that were 5 lb heavier ($P<.05$) than carcasses from NW cattle but had no other effects on carcass traits. Days on feed affected marbling scores independently of calf age or weaning group. EW appears to be a useful tool for reducing marketing interval for retained ownership cattle and for improving marbling scores of cattle at young ages.

(Key Words: Early Weaning, Range, Feedlot, Calves, Carcass.)

Introduction

Producers of calves with superior growth potential and(or) carcass traits can, in some instances, increase the reward for genetic selection if ownership of calves is maintained until slaughter. Postweaning management strategy is important in the success of a retained ownership program. Approaches vary widely, reflecting available resources and traditional practices. For calves with high postweaning growth rate potential, an accelerated feeding program should offer several advantages. Feeding high grain diets to high growth potential calves should allow better expression of genetic potential and allow calves to reach slaughter weight at an earlier age. Resultant feed efficiency should be improved and time necessary to receive payment for the calf crop is reduced.

There is potential for problems in an accelerated production program. Early sustained feeding of high grain diets may damage the ruminal epithelium and cause poor feed conversion. Feeding too much grain early in the growth curve may increase body fat at a given weight. To maintain trim carcasses, slaughter weight may have to be lowered. Finally, young cattle (<14 months) are noted for inconsistent production of choice carcasses.

This study was designed to evaluate the effectiveness of early weaning as a tool for accelerated beef production systems. Our objectives were to determine the effects of early weaning and days on feed on feedlot performance and carcass traits of crossbred steer and heifer calves.

Materials and Methods

Early weaning effects were studied using Charolais-sired steer and heifer calves produced by the crossbred cows maintained at Ft. Meade. Average calving date for all calves was April 2 and ranged from March 8 to May 21. Since calf age was a primary consideration in this study, allotment of calves to treatment groups and feedlot pens

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included age as well as weight stratification. Steers and heifers were balanced across treatment groups and were fed separately.

All calves were weighed September 14 at the ranch. Half of the calves were then shipped 400 miles to the research feedlot at Brookings and were considered the early weaning (EW) group. Calves were allowed access to hay and water overnight. The next morning individual weights were recorded, vaccinations for IBR, BVD, PI_3, H. somnus and 7-way clostridia and ivermectin were administered. The receiving diet (Table 1) including Deccox was fed for 28 days. Diet 2 was fed for 56 days before switching to diet 3. When diet changes were made, grain offered was held constant which actually reduced dry matter offered for the first 2 days after the switch. Beginning the third day after the switch, the new diet was offered to appetite although daily increases did not exceed 10% DMI.

TABLE 1. DIETS FED TO EARLY AND NORMALLY WEANED CALVES[a]

Item	Receiving	Grower[b]	Finisher[b]
Days fed	1-28	29-84	85-slaughter
Corn, cracked	54.1		
Corn, whole shelled		46.75	24.77
Corn, high moisture		21.55	57.80
Hay, %	40.0	25.00	10.00
Molasses, %	3.0	2.75	2.00
Soybean meal, 44%	2.5	3.29	4.07
Limestone, %		.26	1.06
Trace mineralized salt, %	.4	.40	.30

[a] Percentage dry matter basis, all diets contain 1,000 IU vitamin A/lb.
[b] Contain 26 g/T monensin.

Normally weaned (NW) calves were separated from their dams, weighed and shipped to Brookings 39 days later than EW calves (October 23). Calves in both groups were implanted with Ralgro at this time. NW calves were offered the feedlot receiving diet for 27 days (vs 28 days). In all other regards NW calves were managed in the same manner as the EW group. Interim weights were obtained on all calves to reflect weights at common ages and common days on feed. Cattle were reimplanted with Synovex-S or -H 109 days after applying the first implant.

Slaughter dates were April 21 and May 31. Half of the calves from each weaning group were slaughtered on each date. EW calves were fed for 217 or 257 days. NW calves were fed for 179 or 218 days. Cattle were denied access to feed and water for 24 hours prior to taking final weights. On the initial slaughter date, 4 head were removed from each pen. Selection was based upon final live weights. Selected cattle represented the distribution of weights within the pen. Pen was the experimental unit for evaluating feedlot performance. Disturbing pen makeup at the initial kill date limits comparisons of feedlot performance to the time of initial slaughter.

Hot carcass weights were noted at slaughter. After a 24-hour chill, rib fat and rib eye area were measured. Marbling score and percentage kidney, pelvic and heart fat were determined by a federal grader. The same grader was utilized on each slaughter date.

Feedlot data were analyzed as a 2 x 2 factorial where weaning group and gender represented main effects. Pen was considered the experimental unit for evaluating feedlot performance. Six 8 head pens of steers and six 8 head pens of heifers were represented in the dataset. Carcass data were analyzed using weaning group and gender as main effects in a 2 x 2 factorial design. Individual carcasses represented experimental units in those analyses.

Results and Discussion

Calves weaned at normal age started on feed nearly 100 lb heavier than early weaned counterparts (Table 2), because pasture gains were good, exceeding 2.5 lb/day during this period. Steers and heifers had similar feedlot arrival weights. During the initial 28 days in the feedlot, NW calves consumed more dry matter and were less efficient than EW calves. Those differences may reflect the difference in feedlot arrival weights. When NW calves arrived at the feedlot, they were 16 lb lighter (P<.05) than EW calves on that same date.

TABLE 2. FEEDLOT PERFORMANCE OF EARLY AND NORMALLY WEANED FEEDER CALVES

Item	Group		Grower		SEM
	EW[a]	NW[b]	Steer	Heifer	
Feedlot arrival weight, lb	476[e]	573	524	524	4.5
Receiving ADG, lb/head	4.01	4.06	4.25[d]	3.81	.12
DMI, lb/head	13.09[c]	14.38	13.68	13.79	.09
F/G	3.29[c]	3.55	3.22[d]	3.62	.09
Cumulative ADG, lb/head	3.11	3.19	3.31[e]	2.99	.05
DMI, lb/head	18.85[d]	19.72	19.32	19.25	.02
F/G, lb/head	6.07	6.20	5.83[d]	6.45	.12
Apr 21 slaughter weight, lb	1151	1137	1176[e]	1113	7.9
May 31 slaughter weight, lb	1254	1264	1296[e]	1222	12.6

[a] Early weaned.
[b] Normally weaned.
[c] Main effect (P<.05).
[d] Main effect (P<.01).
[e] Main effect (P<.001).

Cumulative feedlot ADG was not affected by weaning age. Daily DMI was higher for NW calves. Since the average weight in the feedlot of NW calves is greater than the average weight of EW calves, greater daily DMI would be expected. Cumulative feed efficiency was not affected by early weaning. Early and normal weaned calves had similar finished weights on both slaughter dates. Steers gained 10% faster (P<.01) than heifers and were more efficient (P<.01; Table 2). On both slaughter dates steers were heavier (P<.001) than heifers. No efforts were made to suppress heat in the heifers. Several heifers suffered vaginal prolapses that required attentiond during the feeding period. Both factors would contribute to poorer ADG and feed efficiency.

There was no difference in final live weight of EW or LW groups. EW carcasses were heavier (750 vs 745 lb; P<.01), but this response may be of limited marketing importance. Rib fat thickness, rib eye area and yield grade were not affected by weaning date.

Carcass data could be evaluated on the basis of feeding groups. The four groups and days on feed were early weaned-early kill date (217 days); early weaned-late kill date (257 days); normal wean-early kill date (179 days) and normal wean-late kill date (218 days; Table 3). Cattle on feed for 179 days produced lighter carcasses, with less rib fat and lower marbling scores (P<.05). When cattle were fed for 217 days as EW or 218 days as NW groups, the older cattle produced heavier carcasses (P<.05). Other carcass traits were similar among the two groups fed for 217 days.

Birth date was known for all calves in this study and calf age was similar in each feeding group. Using calf age as a covariate and gender and feeding group as independent variables, only feeding group was found to affect marbling score. In other words, days on feed was important in affecting marbling score independent of age. Mean age at each kill date was 385 and 425 days. These data indicate that difficulties in getting cattle <14 months of age to consistently produce carcasses with small amounts of marbling are more a function of the feeding program than physiological maturity.

TABLE 3. CARCASS TRAITS OF EARLY AND NORMALLY WEANED CALVES FED FOR DIFFERING PERIODS OF TIME

Weaning group	Early		Normal		
Kill group	Early (217 days)	Late (257 days)	Early (179 days)	Late (218 days)	SEM
Carcass weight, lb[c]	722[e]	778[d]	713[e]	779[d]	12.5
Rib fat, in	.48[de]	.50[d]	.40[e]	.44[e]	.027
Rib eye area, in^2	13.53[de]	13.93[d]	13.69[e]	13.83[de]	.287
Yield grade	2.66[ef]	2.75[d]	2.36[f]	2.55[de]	.122
Marbling score[ab]	5.21[ef]	5.58[d]	4.96[f]	5.50[de]	.120

[a] Slight = 4.0; Small = 5.0; Modest = 6.0.
[b] Weaning group effect P<.10.
[c] Weaning group effect P<.01.
[def] Means within a row with unlike superscripts differ (P<.05).

Early weaning did not accelerate the growth curve of the calves in this study, since EW and NW calves had similar weights at any point in time. Pasture conditions were good and gains by normally weaned calves exceeded 2.5 lb/day during the last 39 days prior to weaning. Under less favorable conditions we have measured poorer gains during this time of year that may make early weaning more appealing.

These data do indicate that, by earlier weaning, calves fed high energy diets will achieve choice grade at a younger age than normally weaned calves. Since similar days on feed were required for either weaning group to produce choice carcasses, early weaning would principally benefit individuals retaining ownership of their calf crop until slaughter.