Effect of Early Weaning of Beef Calves on Performance and Carcass Quality

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Summary

A study was conducted to evaluate early weaning of beef calves at 60-70 days of age on feedlot performance and carcass characteristics. One hundred twenty steer calves sired by either Simmental or Angus sires were weaned at an average age of 67 (early weaned, EW) or 147 (late weaned, LW) days. Calves were allotted to 16 feedlot pens by weaning treatment and sire breed at approximately 750-800 lb. EW calves were heavier (P < .05) in initial feedlot weight. There were no differences due to weaning age on daily gain, dry matter intake, feed efficiency or slaughter weights. Simmental steers required more days on feed than Angus steers (P < .05). Early-weaned calves had a higher percent intramuscular fat (5.7 vs. 5.1%), higher average marbling scores (Small^{78} vs. Small^{20}, P < .05), a higher percentage of cattle grading average USDA Choice and higher (38% vs. 14%, P < .05) and a higher percentage of USDA Prime (10% vs. 0%, P < .05). These data confirm observations in previous studies that early weaning and placing calves on a higher grain diet improves marbling at slaughter. In this study, the effect was shown in calves weaned at an average of 67 days.

Introduction

Early weaning of beef calves has become a common management tool in beef cow herds to reduce the nutritional requirements of beef cows during periods of nutritional shortage and to improve the rebreeding performance of younger and/or thin cows. The definition of early weaning varies, but typically calves weaned at less than 150 days of age would be considered early-weaned.

Weaning calves prior to rebreeding (65-70 days of age) may be useful to initiate cycling and improve rebreeding performance of nutritionally stressed two- to three-year-old and thin cows.

Previous research at the University of Illinois has shown improved carcass quality in early weaned (150 days of age) compared with normally weaned (205 days of age) calves. The effect of extreme early weaning (60-70 days) on carcass traits and performance is unclear.

This study was designed to compare the feedlot performance and carcass characteristics of calves weaned at 67 or 147 days of age.

Materials and Methods

One hundred twenty beef steer calves sired by Angus (N=54) and Simmental (N=66) sires were used in a study to evaluate the effects of weaning at 60-70 days of age on performance and carcass characteristics. Fifty-eight spring-born steer calves were weaned over a 10-d period in June, 1997. The average age at weaning was 67 ± 2 days. The remaining 62 steer calves were weaned in September at an average age of 147 ± 2 days. The early-weaned (EW) calves were fed a concentrate mixture along with long-stem alfalfa hay, each on an *ad libitum* basis from June to September (94 days). The concentrate mixture fed during this period is shown in Table 1. The later-weaned (LW) calves were used in a separate study to evaluate pasture vs. drylot weaning methods. All calves were implanted with Synovex-S on December 18. On January 6, after the conclusion of this study EW and LW calves were allotted to 16 pens (seven to nine head/pen) by sire breed and weaning status. The diet fed during the finishing phase is shown in Table 2. Therefore, eight EW pens (four Angus-sired pens and four Simmental-sired pens) and eight LW pens (three Angus pens and five Simmental pens) were fed to slaughter weight. All cattle were reimplanted with Revalor S on February 16. Cattle were fed to June 1 at which time fat thickness was measured by real-time ultrasound. Steers estimated to have greater than .4 in of external fat were marketed. The remaining calves were fed an additional 21 days. Carcass characteristics including hot carcass weight, fat thickness, ribeye area, marbling score and kidney, heart and pelvic (KHP) fat percentage were measured at slaughter. A ribeye face sliver was collected for the determination of intramuscular fat by ether extract. Feed intake was monitored by pen. All cattle were weighed at approximately 28-day intervals. Data were analyzed using the SAS with pen as the experimental unit.

Table 1. Concentrate fed to early weaned calves

Ingredient	% of DM
Corn	74.7
Dry corn gluten feed	1.5
Ground limestone	.1
Calf starter (18%)	.4
Commercial protein 1[a]	1.8
Commercial protein 2[b]	21.5

[a] Contained 42% CP, 4.4% Ca, 44,000 IU/lb. Vitamin A and 667g/t lasalocid, DM basis.

[b] Contained 44% CP, 4.4% Ca, 11,000 IU/lb. Vitamin A and 222 g/t lasalocid, DM basis.

Results and Discussion

Early weaned calves gained 2.48 lb. per day from June to September (94 days). Average dry matter intake was 10.46 lb. per day, of which 83.8% was concentrate mix and 16.2% was alfalfa hay. Feed/gain over this time period was 4.22 lb. of DM/lb. of gain. The average weaning weight was 233 lb. at an average age of 67 days.

The later-weaned calves were weaned on September 8, at an average age of 147 ± 2 days and a weight of 424 ± 4 lb. These calves were used in a separate weaning management study. All calves were officially allotted to finishing pens in January. The growth of early- and late-weaned calves from June to May is shown in Figure 1. Few differences in growth patterns are apparent, other than some reduced weights in the LW cattle shortly after weaning. This difference was significant in the January allotment weights as shown in Table 3. Note that this difference existed only in the Angus-sired calves. Any difference in cattle weights disappeared in the finishing phase. There were no significant differences in performance or efficiency as affected by weaning treatment.

Carcass data are shown in Table 4. Angus sired steers had more fat thickness, higher yield grades, higher marbling scores, higher quality grades and higher percent intramuscular fat than Simmental steers. Early-weaned calves had higher intramuscular fat, higher marbling scores and a higher percentage of average choice and prime carcasses than LW calves. There were no differences in fat thickness, ribeye area KHP fat or yield grades between the EW and LW treatments. A significant Breed X weaning treatment interaction existed relative to carcass weight. EW Angus were heavier than LW Angus, but EW Simmental tended to be heavier than LW Simmentals. Also a significant sire Breed X weaning treatment existed for intramuscular fat marbling score and quality grade whereby weaning treatment differences were greater for Angus than Simmental sired calves (Figure 2). This is consistent with observations in Illinois studies where quality grades were enhanced by early weaning in studies with fatter slaughter endpoints. It should also be noted that the weaning ages compared in the Illinois study were 150 and 205 days. This study suggests that the carcass effects of early weaning are enhanced further by early weaning as soon as 67 days of age.

Table 2. Finishing phase diet composition [1]

Ingredient	%, DM basis
High moisture corn	79.2
Alfalfa haylage	11.0
Soybean meal	5.9
Ground limestone	1.2
Vitamin-monensin premix [2]	1.3
Urea	.7
Ground corn	.7

[2] Contained 1,000 mg/lb. of monensin, 100,000 IU/lb. Vitamin A and 150 IU/lb.
[1] Formulated to contain 14% CP, .64 Mcal/lb. NEg, .55% Ca, .36% P (DM Basis)

Table 3. Feedlot performance of early- (67 d) and late- (150 d) weaned calves.

	Sire breed			
	Simmental		Angus	
	EW	LW	EW	LW
January weight[a,c]	764	789	797	746
Final weight	1251	1277	1239	1204
Dry matter intake	20.0	20.78	18.35	18.76
ADG, lb.	3.18	3.20	3.25	3.10
Feed/gain	6.38	6.50	5.63	6.06
Days on feed[b]	154	153	148	150
Slaughter age	420	418	421	419

[a]Significant weaning treatment effect ($P < .05$)
[b]Significant breed effect ($P < .05$)
[c]Significant breed ± weaning treatment interaction ($P < .05$)

Table 4. Carcass characteristics of early and late weaned calves.

	Simmental		Angus	
	EW	LW	EW	LW
Hot carcass weight[c]	747	764	757	724
Dressing %	59.7	59.9	61.3	60.2
Fat thickness[b]	.48	.48	.66	.60
Ribeye area	12.7	12.8	12.5	12.2
KHP Fat, %	2.1	2.1	2.1	2.0
Yield Grade[b]	2.9	2.9	3.4	3.3
Marbling score[a,b,c,d]	1009	981	1149	1059
Quality grades				
% Choice and higher [b,c]	64	43	93	93
% Average choice and higher [a,b,c]	7	0	69	29
% Prime [a,b,c]	3	0	17	0

[a]Significant weaning treatment effect (P < .05)
[b]Significant breed effect (P < .05)
[c]Significant treatment X breed interaction
[d]1000 = Small[00], 1100 = Modest[00]

Figure 1. Growth of early and late-weaned Angus and Simmental-sired steer calves.

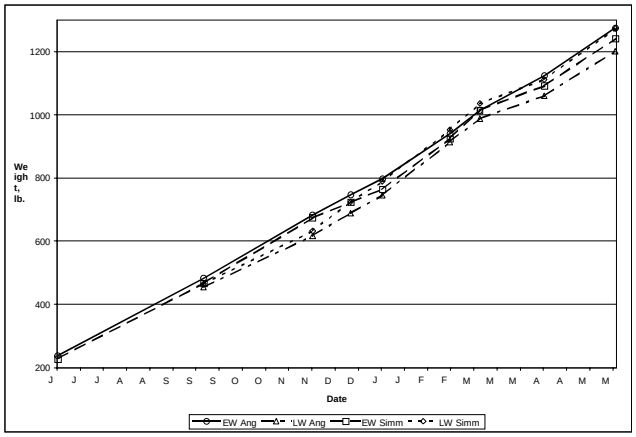

Figure 2. Distribution of quality grade in early and later weaned Angus and Simmental-sired steer calves.