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R. H. Pritchard

South Dakota State University, Brookings, SD

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**Effects of Early Weaning on High Growth Calves
and Subsequent Carcass Characteristics**

R. H. Pritchard
Department of Animal & Range Sciences
South Dakota State University
Brookings, SD

INTRODUCTION

Historically, early weaning has been considered one of those things you might have to do in drought years. We do it because the cow-calf pairs are not realizing their production potential when running on dried up rangeland. For the rancher that has invested in quality bulls and is producing high growth potential calves, the problem is the same, only the circumstances are different. In years when grass production is adequate, high growth potential calves are not receiving adequate nutrition to express their genetic potential. The typical management adjustment in this situation is to creep feed or pre-condition the calves. Either approach is intended to increase on ranch production and hopefully compensate the rancher for these more management intensive programs.

The question we had was why not make a clean break? If we want to feed the calves milled feed, why not put them in the feedlot and feed them? This could allow calves to express their full growth potential, moves the management burden from the ranch to the feedlot and may allow cows to go into winter in better condition. We evaluated this approach assuming the rancher would retain an interest in the high growth potential calves after they entered the feedlot to take advantage of their higher value. Feedlot performance and carcass value would then become an important variable for the rancher in the overall economic feasibility of early weaning.

RATIONALE

I prefer to use the term streamlining to describe beef production systems where ownerships and management systems for a calf are minimized. In streamlined systems we expect ranchers to retain at least part if not total interest in the calves. Retaining an interest in the calf is the one certain approach for receiving fair value for calves with superior production traits. In this situation we would expect calves to be managed to minimize the age at slaughter. There are strong incentives to do this. The rancher that retains ownership of the calf crop will own two calf crops if the cattle on feed from last years' calving are not slaughtered by 12 months of age. Seasonal slaughter cattle prices are typically highest during March-May. Finally, there was little point in investing in a breeding program that generates high growth potential calves and then not feed the calves to express their full potential.

During a 3 year period (Pritchard et al, 1987) had observed that annually the ADG of calves the last month prior to weaning averaged 1.39, .21 and 2.12 lb on four South Dakota ranches. The ADG ranged from -.02 on one ranch experiencing severe drought conditions during

the second year to 2.41 on another ranch in the third year when grass production was very good. Early weaning was an obvious choice during the dry year but appeared to hold merit even in good years since these calves were capable of gains well above 3.0 lb/day. In this research we also observed advantages in cow BW changes if we weaned calves 30 d early. During the dry year control cows lost 55 lb during the last month prior to weaning. Dams of early weaned calves lost only 20 lb during this period. In a year with good rainfall, cows nursing calves lost 21 lb while dams of early weaned calves gained 3 lb the last 30 d of the season. These data suggested that there would be economic benefits available to the rancher if calves were weaned earlier in good years. The benefits would come from reduced cow feed costs and potentially greater gains if calves were moved to the feedlot. The next concern then is whether these young cattle could be fed for April or May slaughter and not be severely discounted because of lower carcass value.

The value concerns for accelerated feeding programs hinge on light, overly fat carcasses that do not grade choice. There are numerous data sets available that will support or refute the potential for reducing carcass weights by pushing light/young cattle too hard. Management, genetics and goals all play a role in how these data should be interpreted. Small framed cattle with limited growth potential will be a problem in accelerated feeding programs. They do require a backgrounding period of 60 to 90 days during which ADG are less than 2.0 lb to avoid light carcass discounts. When larger framed calves are fed, the rules change. Carcass weights of 700 to 775 lb are readily accepted by the industry and easily attained. We (Pritchard et al., 1988a) backgrounded typical calves on corn silage for 112 d vs feeding in an accelerated program slaughtering the cattle at a constant rib fat endpoint. Cumulative feedlot performance and carcass traits (Table 1) indicate accelerated programs can be used effectively. Under current conditions there is no economic advantage to backgrounding these steers. The added costs for interest, feed and yardage caused by backgrounding offset the value of heavier carcasses from backgrounded steers.

Table 1. Effect of Backgrounding on Cumulative Feedlot Performance and Carcass Traits of Steer Calves^a

	Backgrounded	Accelerated	Prob< ^b
Initial BW	484	486	NS
Final BW	1245	1197	.01
Days on Feed	259	226	.0001
ADG	2.94	3.16	.0001
DMI	19.17	19.41	NS
F/G	6.53	6.15	.0001
Dressing Percentage	60.5	60.6	NS
Hot Carcass Weight	753	725	.001
Quality Grade ^c	2.04	2.12	.06
Yield Grade ^d	2.52	2.69	.05

^aLeast squares means

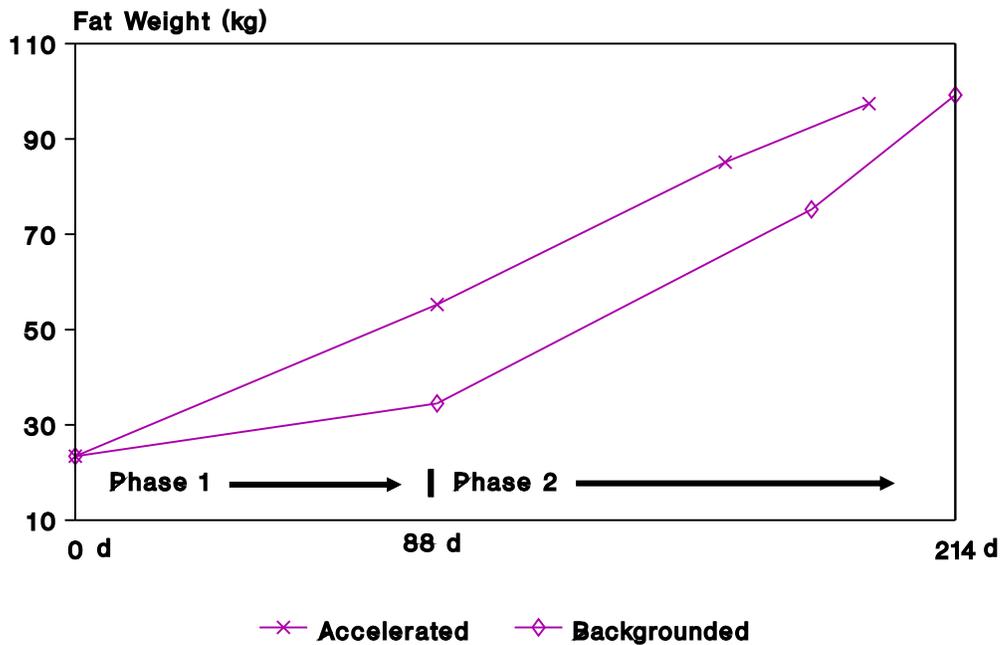
^bProbability value for main effect differences

^cFederal Grade assigned 1 = Prime, 2 = Choice, 3 = Good

^dFederal Yield Grade

In the previous data set quality grade was slightly better using the backgrounding program. Problems with quality and yield grade are to a large extent caused by differences in the growth pattern of calves versus yearlings. Calves do become fleshy at lighter weights than yearlings (Fig 1) (Alderson et al., 1993). As they approach slaughter it is more difficult to tell when calves are "ready". Because they are carrying more flesh at lighter weights there is a tendency to slaughter these calves too early. This causes light carcasses and a low percentage of Choice carcasses. The data in Table 1 suggests we made that mistake on that set of cattle. Avoiding this error could minimize the perceived problems of young slaughter cattle.

Figure 1. Carcass Fat Accretion Rates



Age of cattle at slaughter is still an important factor affecting quality grades and this becomes a major concern when contemplating the use of accelerated feeding. In a streamlined system involving retained ownership, the rancher would probably prefer that the previous inventory be cashed out (in this case slaughtered) by 12 to 13 months of age. Weaning calves at 8 months of age, this would only leave about 125 days in the feedlot. Earlier weaning could be used to increase the days on feed, but it would have to do so without compromising feedlot production.

We (Pritchard et al., 1988b) weaned Charolais sired steer and heifer calves from Angus x Simmental cows at an average age of 168 or 206 d. Mean calving date for these calves was April 2 and weaning dates were either September 14 or October 23. Weaned calves went directly to the feedlot and were fed diets shown in Table 2. Half of the steers and heifers from each weaning group were slaughtered on April 21 and the remaining cattle were slaughtered on May 31. The arrangement of this design, cattle ages and days on feed are outlined in Figure 2.

Table 2. 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	.50	.30

^aPercentage dry matter basis, all diets contain 1,000 IU vitamin A/lb.

^bContain 26 g/T monensin.

Figure 2. Outline of Early Versus Normal Weaning Date Experiment

Weaning Group Date Age	Early Sept 14 168		Normal Oct 23 206	
	Early	Late	Early	Late
Slaughter Group	Early	Late	Early	Late
Date	Apr 21	May 31	Apr 21	May 31
Age	385	425	385	425
Days on Feed	217	257	179	218
Days on Finishing Diet	133	173	95	134

During the 39 days that normal weaning date calves remained with these dams they gained 2.5 lb/day which is good for September-October when no creep feed is being used. This caused nearly 100 lb difference in feedlot arrival weights for the two weaning groups. The early weaned calves went on feed just as well as the normal weaned calves (Table 3). During the initial feedlot receiving period, early weaned calves consumed less feed but were more efficient than calves weaned at 206 d (Table 3). This could be expected because of the lighter body weights when the early weaned calves went on feed. Cumulative feedlot ADG and feed conversions did not differ between early and normal weaned groups. The early weaned cattle did consume less feed than the normal weaning age group.

Table 3. Effect of Early Weaning on Feedlot Performance of Steer and Heifer Calves

	Weaning Group	
	Early	Normal
Feedlot Arrival Weight	476	573
Feedlot Arrival Date	September 14	October 23
Receiving Period		
ADG	4.01	4.06
DMI ^a	13.09	14.38
F/G ^a	3.29	3.55
Cumulative Feedlot		
ADG	3.11	3.19
DMI ^b	18.85	19.72
F/G	6.07	6.20
Slaughter Weight		
April 21	1151	1137
May 31	1254	1264

^aMain effect (P<.05)

^bMain effect (P<.01)

The carcass data from this experiment (Table 4) are particularly interesting. Carcass weights were heavier on May 31 than on April 21 as would be expected. Early vs normal weaning age had no effect on carcass weight on a given slaughter date even though the early weaning group would have been on feed 39 d longer than the normal weaning group. Based solely on carcass weight there appeared to be no postweaning advantages to early weaning. The one place where differences did develop was in quality grades of carcasses. The average marbling score for normal weaned calves slaughtered in April, at 385 d of age, represents a quality grade of High Select. For early weaned calves slaughtered on this same day the marbling scores represent an average quality grade of Low Choice. It is important to remember that these cattle were the same age. The differences in quality grade were caused by differences in the days on feed. On the May 31 slaughter date at 425 d of age, carcass marbling score differences between the two weaning age groups had disappeared. The early weaned calves were now producing fatter carcasses than the normal weaned group. It is important to realize that by this point the early weaned group had been on feed for 257 d.

The price spread between Choice and Select carcasses is typically wide in the spring. The data in Table 4 suggests that when we feed calves a finishing diet for only 94 days, carcass quality grades were inadequate (normal weaning, April 21 slaughter). Feeding the finishing diet for 132 d improved carcass quality grades. It did not matter whether the calves were weaned early and slaughtered in April or weaned at 206 d and kept in the feedlot until May 31.

Table 4. Carcass Traits of Early and Normally Weaned Calves Fed for Differing Periods of Time

Weaning Group	Early		Normal		SEM
	Early (217 days)	Late (257 days)	Early (179 days)	Late (218 days)	
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	13.93	13.69	13.83	.287
Yield Grade	2.66 ^{de}	2.75 ^d	2.36 ^e	2.55 ^{de}	.122
Marbling Score ^{ab}	5.21 ^{ef}	5.58 ^d	4.96 ^f	5.50 ^{de}	.120

^aSlight = 4.0; Small = 5.0; Modest = 6.0.

^bWeaning group effect P<.10

^cWeaning group effect P<.01

^{d,e,f}Means within a row with unlike superscripts differ (P<.05)

CONCLUSIONS

There are large numbers of calves produced in this region with sufficient frame size such that backgrounding is not necessary to produce desirable carcass weights. These cattle are well suited to a streamlined production system where ranchers retain ownership through slaughter at 12 to 13 months of age. Weaning high growth potential calves 40 d earlier than normal will reduce cow weight losses while having no adverse effects on calf performance in the feedlot. By weaning early and using an aggressive feeding program, quality grades can be improved in cattle slaughtered at 12 months of age. This system could be used effectively to optimize production and net returns for some ranchers.

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