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Abstract

A two-year study of early vs. normal weaning of steer calves was conducted in the western Dakotas in 2003-04. The analysis concludes that early weaning improves feedlot production efficiency and reduces per-day and per-pound feedlot production costs. However, early weaned steers are lighter at slaughter; therefore, early weaning lowers carcass revenue relative to normal weaning. The early weaning effect on the profitability of retaining calves through the feedlot stage was not statistically significant. However, the analysis indicates that early weaning does have a positive effect on cow health, pasture utilization rates, and that it therefore has the potential to be an effective drought management tool for grazing cattle during periods of inadequate precipitation.



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The Effect of Early versus Normal Calf Weaning on Feedlot Performance and Herd Management: A Northern Plains Case Study

By Dr. Scott Fausti, Douglas G. Landblom, Dr. Patricia S. Johnson, Dr. Martin K. Beutler, Dr. Roger N. Gates, Robin R. Salverson, Dr. H. Patterson, and Dr. Steve I. Paisley

Introduction

The western region of the Dakotas is a semi-arid region of the Northern Plains. Cow/calf operations are a very important segment of the agricultural sector in this region. However, with the exception of recent historically high profits from cattle marketing, profit margins in cow/calf production are slim due to high production costs (Taylor and Field, 1995). The majority of costs in cow/calf businesses are for harvested feed (Taylor and Field, 1995). Systems that rely more on grazing and less on harvested and purchased feedstuffs have a higher potential to be profitable (Adams, et al., 1994), but these systems can be stressed during periods of low precipitation and drought. The development of systems that lower production costs while adding value to calves would be beneficial to sustaining and improving rural communities in the drier regions of the western U.S.

Early weaning is a herd management strategy that has drawn the interest of scientists investigating cow/calf production and marketing issues. Research has shown calves weaned at 100 to 150 days of age were heavier and younger at slaughter than normal weaned (weaned at 225-250 days) calves (Peterson, et al., 1987). Meyers, et al., (1999) reported that an early weaning herd management strategy improved the percentage of steers grading average choice or higher and also improved feed efficiency relative to a normal weaning strategy. These results reported by Meyers, et al., (1999) suggest early weaning can improve profitability.

In this paper we present the research results for the first two years of an ongoing cow/calf herd management project being conducted in the western Dakotas by North and South Dakota State Universities. We discuss the effect of early versus normal weaning on a) steer calf feedlot performance (economic and physiological); and b) cow health and pasture utilization rates.

The research suggests that a herd management strategy of early weaning will enhance the economic sustainability of cow/calf operations during periods of drought. Research protocols employed in this research were reviewed and approved by the Institutional Animal Care and Use Committees in North Dakota and South Dakota.

Background¹

Over a two-year period (2003-2004), cow herds from the South Dakota State University (SDSU) Antelope Range and Livestock Research Station (136 cows) and the North Dakota State University (NDSU) Dickinson Research Extension Center (176 cows) were used in the study. At each location, spring-born calves were weaned from cows at approximately 140 days (mid-August) or 215 days of age (early November).

The steer calves from Antelope Station (Yr. 1) were transported immediately after weaning to the NDSU Hettinger Research Extension Center for backgrounding. The project protocol required early (EW) and normal (NW) weaned steers to undergo a backgrounding phase that lasted, on average, 52 days after weaning. Normal weaned steers nursed, on average, 80 days longer than early weaned steers. The background diet for both groups consisted of locally grown forage and a commercial co-product pellet. Two to four weeks prior to each weaning date, calves were immunized against bacterial and viral diseases; they were administered a booster vaccination at weaning.

Following the backgrounding phase, Antelope and Dickinson steers were transported to Decatur County Feed Yard, Oberlin, Kansas. The feedlot arrival weight and age for the early weaned steers was 578 lbs and 195 days old, as compared to 748 lbs and 274 days for the normal weaned steers. The timing decision for marketing of finished cattle was based on the electronic cattle management system employed at the Decatur County Feed Yard. Finished steers were marketed using either a fat depth end point signal of 10 mm. or when the system indicated the animal reached its optimal weight. Steers were slaughtered at a commercial plant and carcass data were collected.

The Effect of Early Weaning on Calf Performance

Early weaned steers arrived at the feedlot approximately 80 days younger and 170 pounds lighter than their normal weaned

counterparts. Early weaned steers spent, on average, 31 days longer in the feedlot but were 50 days younger and 92 pounds lighter at slaughter (live wt.). These data agree with the findings of Peterson, et al., (1987) that reported early weaned steers were younger at slaughter but does not agree that early weaned steers will be heavier at slaughter.

Early weaned steers, on average, gained more weight in the feedlot, but average daily gain was not affected by the treatment. Early weaning did improve feeding efficiency by approximately 18.5 percent. This result agrees with the findings of Meyers, et al., (1999) who also reported an increase in feed efficiency.

There is no statistical evidence that weaning treatment affected carcass yield grade, fat depth, or dressing percentage. However, normal weaned dressed carcasses were, on average, 53 pounds heavier. This hot-carcass-weight differential explains a majority of the \$55 dressed carcass revenue differential advantage that normal weaned steers had relative to early weaned steers. On the issue of quality grade, normal weaned steers had a slightly higher average quality grade. This result is in contrast to the findings of Meyers, et al, (1999). However, the Meyers, et al., study reported data on early weaned steers that were heavier and much closer in age at slaughter to the normal weaned group relative to the steers in our study. In comparison, our early weaned steers were 358 days old at harvest as compared to 429 days in Year 1 and 440 days in Year 2 of the Meyers, et al., study. We believe age and weight are the factors causing the contrast in quality grade results between the two studies. This issue is under investigation at this time.

On the issue of economic return, accounting profit was higher for normal weaned steers; however, these results were not statistically significant. Increased feed efficiency does appear to have an effect on the cost side of the feedlot profit equation. Early weaned steers, on average, only incurred an additional \$10.68 per head in total feedlot cost relative to normal weaned steers, and this differential was not statistically significant. This minimal cost differential occurred despite early weaned steers spending an additional 31 days in the feedlot and incurring, on average, an additional \$3.09 per head in medical expenses while in the feedlot. The improvement in feed efficiency of early weaned calves appears to have resulted in a decline in the average cost per pound gained in the feedlot of approximately

19 percent, declining from \$0.62 per pound for normal weaned steers to \$0.50 per pound for early weaned steers.

The analysis indicates that the benefits of early weaning are improved feedlot efficiency, a reduction in the lifecycle of the calf, and a reduction in average cost of feedlot production. The disadvantage is directly related to the lower slaughter weights, which translate into lower carcass revenue.

Calf health also seems to be an important variable affected by early weaning. Analysis revealed that when an animal is pulled for medical reasons, total cost increases by almost 10 percent. The analysis indicated that 71 percent of the early weaned steers had been pulled at least once for vet care, as compared to only 44 percent of the normal weaned steers. This suggests feedlot entry age has an effect on the incidence of feedlot disease events requiring intervention. Illness negatively affects feed efficiency and average daily gain as well as total feedlot cost.

Steers in this study were subjected to an aggressive animal health management program that included pre- and post-weaning vaccination and early disease detection in the feedlot. Aggressive early detection and treatment with long-acting new generation antimicrobials reduced death loss among early weaned steers, but treatment cost directly related to calf weaning age averaged \$3.09 higher per head for early weaned steers. Backgrounding early weaned steers longer may be one solution for reducing medical cost and lost productivity in the feedlot due to illness.

Additional Benefits of Early Weaning for Herd Management

Preliminary evidence of an early weaning effect on herd management suggests a positive benefit for cow health and pasture carrying capacity relative to normal weaning. The pasture management data was collected at the NDSU Dickinson Research Extension Center. Currently, research on the effect of early weaning on pregnancy rates, grazing intensity rates, and the economic benefits to the cow/calf production system of increasing those rates is ongoing.

With respect to carrying capacity, the data indicate that forage disappearance for cows that had calves weaned early was 803 kilograms per ha, whereas forage disappearance for the normal

weaning group that nursed their calves an additional 80 days was estimated at 1109 kilograms per ha. This preliminary result suggests early weaning reduced forage disappearance by approximately 28 percent.

The research protocol selected cow body weight and cow body conditioning score as the proxies for cow health. Normal and early weaning treatment cows were weighed and evaluated to determine their body condition score (BCS) in August and November. Cows in the early treatment group, on average, gained 16 pounds and their BCS score improved from 5.18 to 6.09.² Cows in the normal treatment group, on average, lost 137 pounds and their average BCS declined from 5.26 to 4.70. These preliminary results suggest that early weaning may provide potential economic benefits to producers by increasing the production efficiency of their cow/calf production system relative to the traditional alternative of normal weaning.

Summary

The analysis of the data from the two-year early weaning study conducted in the western Dakotas reveals that early weaning provides a cost efficiency advantage resulting from improved feed efficiency, but early weaned steers are at a disadvantage due to lower slaughter weights and subsequent lower carcass revenue per head relative to normal weaned steers.

Preliminary results indicate that early weaning has the potential to increase the efficiency of a producer's cow/calf production system. Our research indicates that early weaning improves pasture carrying capacity and cow health. Increased stocking rate and the potential to improve reproductive rates will contribute to the producer's bottom line.

Results from this study also suggest that early weaning can be used as a management tool during periods of low precipitation when cattlemen are forced to separate calves from their mothers. Early weaning provides producers a herd management strategy during periods of drought for conserving resources and improving the long-run sustainability of their cow/calf operation. Producers may view the benefits of conserving ranch resources during periods of drought as a reasonable tradeoff for lower steer weights at market. These efficiencies can also be effectively captured and used during periods of adequate precipitation as a means to increase stocking rate or renovate previously overgrazed pastures.

Endnotes

¹ For a more detailed discussion of the experimental design of the two-year study see Landblom, et al., (2006).

² For a comprehensive discussion of the methodology for determining body conditioning scores for beef cows see Eversole, et al., (2000).

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