

## **Project Summary**

**The Effect of Calf Morbidity during the Suckling and Feeding Phases on Feedlot Health, Feeding Performance, Carcass Characteristics, and Beef Quality**

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# **The Effect of Calf Morbidity during the Suckling and Feeding Phases on Feedlot Health, Feeding Performance, Carcass Characteristics, and Beef Quality: Project Summary**

## **Background**

Recent research has explored the relationship of feedlot respiratory disease on feeding performance, carcass characteristics and profitability. Data from the Texas Ranch to Rail program has shown that feedlot calves that remain healthy have a significantly higher net profit compared to calves treated for disease. This difference was due to a combination of lower death loss, improved average daily gain, lower cost of gain and 15% more Choice carcasses. A similar relationship has been described in feed yards in Iowa, Oklahoma and Canada where calves treated for respiratory disease showed a decrease in profitability of nearly \$58 per head compared to healthy calves. These negative effects on animal performance and carcass traits are more pronounced the more times an individual animal is treated.

Oklahoma State University researchers explored the effect of lung lesion on feedlot performance, carcass traits and meat quality. In these studies, 48% of treated calves had lung lesions (14% active lesions), while 37% of non-treated calves were affected (9% active). Active lesions were defined as having evidence of infection in the bronchial lymph nodes. Carcasses from calves with lung lesions also had significantly less tender steaks (higher Warner-Bratzler shear force (WBS) scores) than carcasses without lesions when tested at five days after harvest. At harvest, carcasses from calves without lung lesions were worth nearly \$74 more compared to calves with a combination of chronic and active lesions.

There is at least some debate on the effect of pre-weaning morbidity on quality grade. Work with early weaned calves would indicate that marbling deposition starts before seven months of age and management prior to this time can affect fat deposition. It would also appear that there is a minimum average daily gain that is required for marbling to be initiated in the young calf and this can be affected by management. Pre-weaning disease, whether due to indirect (lack of colostrum) or direct (pathogen load) effects, will have a negative impact on growth rate in calves and may affect marbling deposition for a period of time. It would also be useful to know if pre-weaning respiratory disease contributes to lung lesions at harvest or if neonatal calf scours or other disease has a negative impact on marbling and quality grade. However, the relationship between the incidence of pre-weaning disease and post-weaning performance has not been explored adequately.

The primary objective of this study was to determine if calf morbidity that occurred prior to feed yard arrival negatively affects carcass traits and beef tenderness. Five Iowa cow/calf producers and their veterinarians were recruited for this project. The calving seasons for these herds ran from February 1 through April 15 and these producers retained ownership on their calves through the Tri-County Steer Carcass Futurity (TCSCF) in southwestern Iowa. A secondary objective was to evaluate the effect of feedlot morbidity on feeding performance, carcass characteristics and tenderness.

## **Methodology**

These producers consigned a total of 359 spring born calves and their health performance was tracked from birth through feeding and harvest. The time frame from birth until the calf was weaned and removed from the cow was considered as the suckling phase. The preconditioning

phase was considered the number of days that the calves spent on the farm of origin, following weaning and prior to being sent to the feedlot. All calves were individually identified. Calf birth date, dystocia score, organ system affected and date of treatment were all recorded by the cooperating cow/calf operations during the suckling phase.

Following weaning, calves were monitored on the farm of origin for the preconditioning program prior to being sent to the feed yard. Calves requiring treatment had their number, date of treatment and the organ system affected recorded. This same information was collected at the feedlot where the calves were finished out prior to harvest. Receiving protocols, treatment programs and diagnostic samples collected were at the discretion of feedlot personnel and the consulting veterinarian. Any diagnostic samples taken were submitted to the Iowa State University Veterinary Diagnostic Lab for further testing.

At the time of harvest, lung lesion scores, carcass characteristics and steak samples for WBS testing were collected. Steaks samples were aged 14 days and then frozen prior to WBS testing. This information was combined with the individual health, feeding and economic performance data into an Excel™ spreadsheet by TCSCF personnel. This data was submitted for statistical analysis using SAS™. Univariate modeling was used to evaluate the affect of morbidity on feeding performance, carcass characteristics and tenderness. Due to the fact that there was a relatively low level of suckling calf and preconditioning morbidity (n=25), these animals were combined into one variable (Pre-feedlot). This enabled researchers to compare the effects of calf morbidity that occurred before and after the calves reached the feedlot.

## **Findings**

Calf morbidity occurring prior to feedlot arrival did not affect whether or not the calf was treated during the feeding period, feed to gain, marbling score, quality grade or lung lesion score. All other carcass traits were not affected by calf morbidity that occurred prior to feed yard arrival. This may indicate that calf morbidity does not affect subsequent performance or it is possible that the study had so few sick calves the model was not able to delineate these effects. Also, of the 25 calves treated prior to feedlot entry, only three calves required more than one treatment. There was an unexplained interaction between calf morbidity at the ranch of origin and feed yard morbidity that actually appeared to improve beef tenderness. This may merely be a result of the long lag-time between treatment at the ranch and harvest date after feeding, or it could be impacted by the fact that the calves in this study had been selected for improved carcass traits over several generations. Additional research will be needed to better explain this relationship.

The number of times an animal was treated in the feed yard did have an effect on feeding and carcass performance (Table 1). Overall average daily gain (ADG), marbling score, quality grade and profit or loss were affected by the number of treatments. As the number of times a calf was treated went from 0 to  $\geq 2$ , the number of carcasses failing to grade Choice increased. Feed to gain, WBS scores (lbs.), yield grade, and hot carcass weight (HCW) were not affected by feed yard treatment. There was no difference in lung lesion scores regardless of how many times a calf was treated in the feedlot.

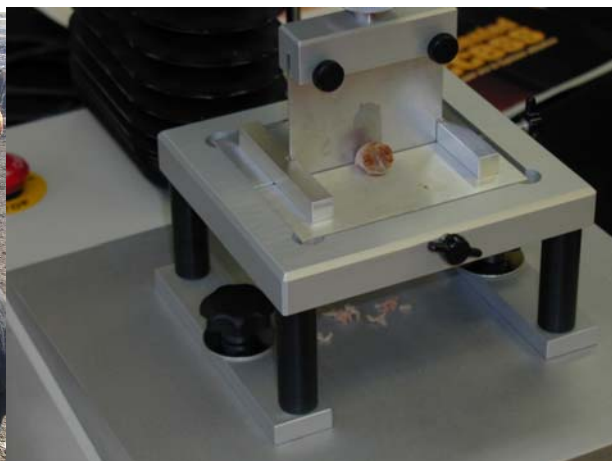
**Table 1. Effect of feedlot treatment on feeding and carcass performance**

	Number of Times Treated		
	0	1	$\geq 2$
Number of calves	203	94	62
Overall Average Daily Gain (lbs.)	3.29	3.35	3.11
Marbling score	1042.3	1016.9	999.6
WBS value (kg)	2.73	2.94	2.94
Profit or (Loss)\$	62.21	58.96	(38.24)

### **Implications**

It would appear from this data set that calf morbidity occurring prior to feedlot arrival has little impact on feedlot and carcass parameters in these cooperating herds. The calves in this trial had a relatively low level of morbidity and the vast majority of treated calves responded to a single treatment, regardless of the body system affected. Based on these results, calves that undergo mild clinical signs and respond relatively quickly to treatment should not be automatically eliminated from consideration for a retained ownership program.

The results from the feedlot portion of this trial support other studies that show the detrimental effect of feedlot morbidity on feeding performance and carcass characteristics. Calves that were treated in the feed yard suffered decreased average daily gain, decreased marbling scores, lower quality grades, increased WBS values and made less money than untreated calves. This emphasizes the need to properly prepare calves for the feed yard environment before they leave the ranch of origin. Preconditioning programs need to emphasize decreased stress at the time of weaning, the role of proper nutritional management, and the importance of a solid vaccination program to avoid costly treatments at the feed yard.



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