BEEF CATTLE RESEARCH UPDATE

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Effects of a Single Foot Rot Incidence on Feedlot Performance

Foot rot is a common disease in feedlot cattle that is characterized by swelling and lameness in one or more feet. It is caused by the bacteria *Fusobacterium necrophorum* or *Bacteroides melaninogenicus*. These bacteria are common in the environment, and *F. necrophorum* is present in the rumen and feces of normal cattle. Mechanical injury or softening and thinning of the interdigital (between the toes) skin by puncture wounds or continuous exposure to wet conditions are necessary to provide entrance points for infectious agents[1]. The occurrence of foot rot in feedlots is highly variable and often seasonal, occurring during periods of extreme moisture or severe drought, or with the presence of frozen or muddy pens[2]. During a 12-month period in a large Colorado feedlot[3], 72 disease or abnormal conditions were recorded. Foot rot ranked fourth in terms of total disease occurrence, after lower respiratory disease, unspecified lameness, and bullers. A survey[4] of five large western feedlots in Oklahoma and Kansas showed that lameness accounted for 16% of all feedlot health problems. It was concluded that when cost for actual treatment, cost associated with chronically affected cattle, and overhead expenses were totaled that the average foot rot incidence cost $59.94 per affected animal[5].

Feedlot performance records from the U.S. Meat Animal Research Center feedlot in Clay Center, NE for the years 1993 through 2000 were recently analyzed to evaluate the impact of foot rot on daily gain and days on feed[6]. Records on 7,100 steers (spring-born calves weaned in fall) with a single foot rot incidence with no other morbidities were examined. The data was divided into three production periods to roughly correspond with industry production practices: starting (0 to 60 days), growing (61 to 121 days), and finishing (121 days to slaughter). The standard treatment for foot rot included antibiotic therapy and topical treatment with iodine and oil antiseptic on affected feet.

In this dataset, 6.5% of the steers were treated for a single foot rot incident. Over the total feeding period, a single foot rot incident significantly reduced gains by 2.4% (2.86 vs 2.79 lb/day) and increased days on feed from 262 days to 267 days. Steers diagnosed with foot rot during the starting period, tended to gain more (0.07 lb/day) and finished nearly 10 days sooner than non-affected steers. Steers diagnosed with foot rot during the growing phase tended to gain similarly to non-affected steers. Steers diagnosed with foot rot during the finishing phase gained less (0.11 lb/day) and required over 14 more days to finish than non-affected steers. These cattle treated for foot rot during the finishing phase had fewer days to compensate for gain losses during the foot rot incident and thus, gained slower than non-affected steers. These data suggest that the earlier the onset of the foot rot incident, the less affect the disease had on gains or days till slaughter.

Texas Tech University researchers in 1991[7] reported on two experiments where a high incidence of foot rot was observed in feedlot steers (about 25%) during the first 28 days of a feeding period. The performance of cattle treated for foot rot was compared with cattle in the same experiments not treated for foot rot (Figure 1). In Experiment 1, gains of steers treated for foot rot were 35% less than steers without foot rot over the first 28 days of the feeding period (1.84 vs 2.83 lb/day). The daily gains of steers treated for foot rot improved during the remainder of the feeding period but did not equal the gains of steers without foot rot at the end of the 140 day experiment (2.62 vs 2.79 lb/day). In Experiment 2, steers treated for foot root only gained 8% less than steers without foot rot over the first 28 days of the feeding period (3.24 vs 3.52 lb/day). Over the remainder of the 160 to 180 day feeding period, steers treated for foot rot compensated for their lower initial gains and gained comparable to the steers without foot rot. Both this data and the Nebraska data suggest that cattle treated for foot rot early in the feeding period can fully compensate for this lost gain later in the

feeding period provided the cattle are on feed long enough to recover. In the Nebraska data, calves were on feed about 260 days and thus had more time to recover lost gain due to foot rot. Whereas, in the Texas data, cattle on feed for 140 days did not fully recover lost gain due to foot rot.

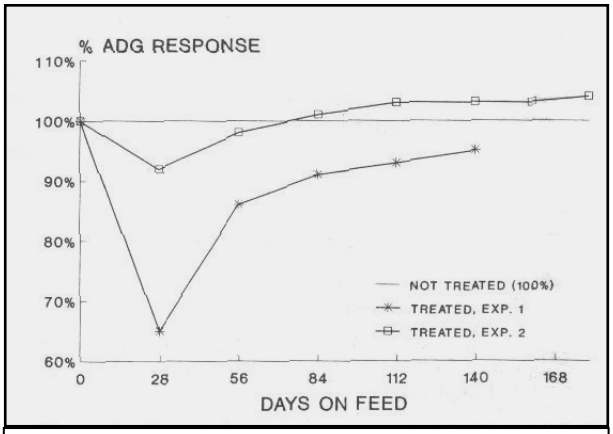

Figure 1. Cumulative average daily gain over time of steers treated for foot rot compared to steers without foot rot.

Many of the problems of foot rot can be avoided by thoroughly cleaning and repairing pen surfaces after cattle are removed. However, *F. necrophorum* has been shown to survive in the soil for up to 10 months. Maximum drainage in the feedlot aides in preventing constant contact with manure-laden mud or water. Clean yards that are free of sharp objects such as stones or frozen, muddy rough ground aid in preventing hoof injury and infection. Mounds in feedlot pens help to promote drainage and give cattle a dry place to lie down.

Feeding organic iodine (EDDI: ethylenediamine dihydriodide) may help prevent foot rot. However, the Food and Drug Administration (FDA) prohibits the use of iodine from EDDI in excess of 10 mg per head per day and this amount of EDDI may be of limited benefit.

Feeding chlortetracycline (CTC) may also help prevent foot rot. Low level feeding of CTC is labeled through the FDA for beef cattle, for the reduction of liver abscesses at 70 mg per head per day. *F. necrophorum* is the major infective agent in liver abscesses and foot rot in cattle. CTC is labeled at 350 mg per head per day (at least 0.5 mg per lb per day) in beef cattle under 700 lbs, and 0.5 mg per lb per day in cattle over 700 lbs, for the prevention of anaplasmosis. Consequently, many mineral mixes and commercial supplements are formulated to provide 350 mg per head per day to control these diseases listed on the CTC label. Since foot rot is caused by the same organism as liver abscesses, some control of foot rot should occur with the feeding of CTC. However, CTC is not labeled for the control or prevention of foot rot.

When cattle are moderately to severely deficient in dietary zinc, supplemental zinc may reduce the incidence of foot rot. Zinc is important in maintaining skin and hoof integrity and helps promote wound healing and therefore, adequate dietary zinc may help minimize foot rot and other types of lameness. In a three year Kansas[8] study with 696 crossbred steers grazing early summer native pasture, adding zinc methionine (ZinPro 100®) to a free-choice mineral supplement reduced the incidence of foot rot from 5.48 to 2.45%.

In summary, foot rot and other lameness issues can substantially reduce performance of feedlot cattle. The most important preventive measures are centered on the protection of interdigital skin health. Many of the problems of foot rot can be avoided by maintaining good pen conditions and thoroughly cleaning and repairing pen surfaces after cattle are removed. Feeding a nutritionally balanced ration with higher amounts of zinc may help prevent foot rot.

Comparison of Regular Fed versus Long Fed Angus-Sired Heifers

The beef cattle industry today uses a value-based marketing system and carcass composition plays a big role in the value of each individual animal. Producers must manage cattle correctly to increase opportunities for premiums and decrease discounts. One way to increase premiums is to feed cattle high grain diets for a longer period of time to improve quality grades. However, when cattle are fed longer they also tend to deposit more subcutaneous fat increasing yield grades and the chance of receiving a yield grade discount. Recent Iowa State University research[9] evaluated 96 Angus-sired heifers that were fed for a regular period of time (RF: approximately 0.45 in. of rib fat cover) versus being fed a longer time (LF: approximately 0.70 in. of rib fat cover).

LF heifers were fed an average of 51 days longer, had 86 lb heavier carcasses, and 0.85 sq. in. larger ribeyes than RF heifers. RF heifer carcasses graded 85% choice and 15% select. LF heifer carcasses graded 19% prime, 79% choice, and 2% select. The RF heifer carcasses were mainly yield grades (YG) 2 and 3 (72 and 26%, respectively) with no YG 4s. The LF heifer carcasses were 21% YG 2, 60% YG 3, and 17% YG 4.

The value of the heifers were calculated using a carcass grid with the following $/cwt deviations from the base price for a Choice YG 3 carcass: Select -$12.41, Prime +$6.00, certified Angus beef +$3.00, YG 1 +$4.00, YG 2 +$2.00, and YG 4 -$20.00. In this study, there were no Standards, YG 5, dark cutters, or heavy (>950 lb) or light (<550 lb) carcasses which would have received additional discounts. Using this grid, RF and LF heifers had average carcass value of $949.39 ($150.11/cwt) and $1,059.96 ($147.64/cwt), respectively. This study indicated that LF heifer carcasses were worth more because of increased carcass weights and improved quality grades. However, value per cwt was greater for RF heifers versus LF heifers primarily because of the increase in discounts from higher yield grades in LF heifers.

Carcass weight appeared to be the most single important driver of differences in beef carcass value per head in this study. Recent Colorado research[10] came to this same conclusion when evaluating cattle carcass values with both quality-based and yield-based carcass pricing grids. With both grids, carcass weight accounted for 73 to 86% of the variation in total revenue per head when the Choice-Select spread was $\leq$$10. With a Choice-Select spread of $20, carcass weight accounted for 50 to 67% of the variation in total revenue per head.

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