



BEEF CATTLE RESEARCH UPDATE

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Effect of BRD during the Receiving Period on Feedlot Performance and Carcass Characteristics

Bovine respiratory disease (BRD) is the most common and costly beef cattle disease in the United States. Numerous studies have indicated that BRD morbidity and the extent of medical treatment have major consequences on feedlot performance and carcass traits. A 2011 USDA survey of U.S. feedlots with a capacity of 1,000 or more head reported that 96.9% of the feedlots had cattle that were affected by BRD affecting 16.2% of cattle placed on feed.¹ Oklahoma State University research evaluated the effects of BRD incidence on subsequent finishing performance, efficiency, carcass characteristics, and lung scores of steers.²

In this experiment, 516 crossbred steers (478 lb initial weight) were purchased over the course of one week at livestock auctions throughout Oklahoma and transported an average of 84 miles to the Willard Sparks Beef Research Center (WSPRC) at Stillwater. At initial processing at the feed yard, all calves were vaccinated for the BRD complex, administered a 7-way clostridial vaccine, and treated for the control of internal and external parasites. Bulls (355 head) were surgically castrated and calves with horns (57) were horns tipped. A receiving diet was fed for 87 days and the steers were monitored daily for clinical signs of BRD. The overall morbidity and mortality attributed to BRD were 66.5 and 13.2%, respectively. After this receiving period, a subset of 174 calves were grouped by the number of times treated for BRD and randomly allocated to finishing pens. The experimental groups included never treated for BRD (0X; 8 pens) and treated 1 time (1X; 8 pens), 2 times (2X; 8 pens), or 3 or 4 times (3/4X; 8 pens). Ultrasound estimates of 12th rib fat thickness on days 91 and 138, body weight (BW), and visual appraisal were used to target a common body composition (average days on feed = 182).

The finishing performance and carcass characteristics of the steers in the various BRD treatment categories are shown in Table 1. Body weight (BW) at arrival at WSBRC before the initiation of the receiving experiment did not differ ($P = 0.17$) between treatment groups (22 lb difference between 0X and 3/4X for the calves used in the finishing experiment). However, BRD treatment during the receiving period decreased performance. As a result, there was a linear decrease ($P < 0.001$) in initial BW (141 lb difference between 0X and 3/4X) at the start of the finishing phase. Average daily gain (ADG) over the entire finishing period linearly increased ($P = 0.05$) as the number of BRD treatments increased indicating that calves previously treated for BRD compensated for lost performance that occurred during the receiving period (compensatory gain). As a result, the final BW difference between 0X and 3/4X was only 35 lb.

Average dry matter intake (DMI, lb/day) over the entire finishing period did not differ between groups. However, DMI expressed as a percentage of average BW increased linearly ($P < 0.001$) as the number of BRD treatment increased. The authors noted that this is "additional evidence of the attempted compensation for reduced performance that occurred during the receiving period among antimicrobial treated calves". During finishing, gain efficiency did not differ between treatment groups.

In order to reach a common body composition (0.50 inches 12th rib fat thickness at slaughter), days on feed increased linearly ($P = 0.002$) as BRD treatments increased. With increasing BRD treatments, hot carcass weight (HCW), dressing percent, rib eye area, and quality decreased linearly ($P \leq 0.03$).

In Table 1, the total calf value shown was calculated by adjusting for the cost of antimicrobials, increased labor, and variation in yardage and feed consumption due to differences in days on feed. These differences in total calf value resulted in a reduction of \$37.87, \$166.89, and \$230.46 for 1X, 2X, and 3/4X, respectively, when compared with 0X.

Table 1. Finishing performance, carcass characteristics, and feedlot economics of steers that received 0, 1, 2, or 3 or 4 treatments for bovine respiratory disease (BRD) during the receiving period.

Item	Treatment administered ¹				P-values ²	
	0X	1X	2X	3/4X	Overall	Linear
<u>Finishing Performance</u>						
Initial BW, lb	714	697	628	573	<0.001	<0.001
Final, BW, lb	1252	1261	1235	1217	0.04	0.01
ADG, lb/day	3.11	3.33	3.15	3.40	0.02	0.05
DMI, lb/day	21.08	21.56	20.88	21.50	0.57	0.75
DMI, % of BW	2.14	2.21	2.24	2.40	<0.001	<0.001
Gain:Feed	0.148	0.154	0.151	0.158	0.22	0.09
Days on feed	174	170	193	189	0.002	0.002
<u>Carcass Characteristics</u>						
Hot carcass weight, lb	820	814	794	778	0.004	<0.001
Dressing percent	65.5	64.6	64.2	64.0	0.003	<0.001
Ribeye area, sq. inches	14.2	14.6	14.1	13.5	0.050	0.03
12 th rib fat, inches	0.52	0.50	0.54	0.55	0.830	0.49
Percent Choice and Prime	70.3	56.5	60.2	36.2	0.060	0.03
<u>Feedlot Economics</u>						
Total calf value ³ , \$	1643.80	1605.93	1476.91	1413.35	<0.001	<0.001
Total calf value difference from 0X, \$	0.00	-37.87	-166.89	-230.46	<0.001	<0.001

¹Number of antimicrobial treatments administered for BRD during the receiving period: never treated for BRD (0X), treated once for BRD (1X), treated twice for BRD (2X), or treated 3 or 4 times for BRD (3/4X).

²Significance: Overall, Linear effects of number of BRD treatments.

³Total carcass value (base carcass price = \$199.87/100 lb of HCW) adjusted for additional costs associated with antimicrobial treatment, labor, yardage, and feed consumption.

Adapted from Wilson et al., 2017.

These researchers concluded that these results suggest that with additional days on feed, calves treated multiple times for BRD are able to reach similar compositional endpoints as their untreated cohorts. Feeding additional days results in increased costs but also allows for compensation of lost performance and recovery of economic losses incurred early in the feeding period. Thus, they would not recommend the railing or realizing of calves treated multiple times for BRD because losses can be minimized if these calves are allowed additional days on feed and marketed as finished cattle. However, it may not be possible for these calves to achieve equivalent carcass yields, quality grade, and carcass values.

¹ USDA-APHIS. 2013. Pages 27-28 in Feedlot 2011 Part IV: Health and Health Management on U.S. Feedlots with a Capacity of 1,000 or More Head. USDA-APHIS-Veterinary Services, Fort Collins, CO. Available: https://www.aphis.usda.gov/animal_health/nahms/feedlot/downloads/feedlot2011/Feed11_dr_PartIV.pdf.

² Wilson, B. K., D. L. Step, C. L. Maxwell, C. A. Gifford, C. J. Richards, and C. R. Krehbiel. 2017. Effect of bovine respiratory disease during the receiving period on steer finishing performance, efficiency, carcass characteristics, and lung scores. Prof. Anim. Sci. 33: 24-36.

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