BEEF CATTLE RESEARCH UPDATE

Britt Hicks, Ph.D., PAS
Area Extension Livestock Specialist
Oklahoma Panhandle Research & Extension Center

March 2009

Effect of Respiratory Disease on Cattle Performance and Carcass characteristics

Recent Kansas State University research determined the incidence of apparent bovine respiratory disease (BRD) in receiving cattle and the effect of BRD on subsequent cattle growth and carcass characteristics.[1] This study used 665 crossbred beef heifers (496 lb initial weight) obtained from commercial sale barns in Kansas and the southeastern United States. During a 36-day receiving period, heifers exhibiting clinical signs of apparent BRD and having a rectal temperature of 103.5ºF or greater received antibiotic therapy and were returned to their home pen. During this receiving period, 40.3, 37.1, 11.7, and 10.8% of the heifers were treated 0, 1, 2, or 3 times, respectively. Following the receiving period, the heifers grazed native grass pasture for 136 days and then were finished in a commercial feedlot for 124 days.

The effects of treatment for BRD on the performance of the heifers during the various period of the trial are shown in Table 1. Heifers treated for BRD had decreased initial weights, daily gains, and final weights during the receiving period compared with heifers never treated for BRD. These researchers reported that the initial body weight data suggest that lighter cattle are more prone to outbreaks of BRD which may be result of age differences assuming that lighter cattle are typically younger than heavier cattle. The decreased daily gains associated with BRD agree with observations noted in numerous other studies. As would be expected, death loss during the receiving period increased for heifers treated for BRD and was 0.4, 0.4, 2.5, and 4.0% for heifers never treated or treated 1, 2, or 3 times respectively.

Table 1. Growth of heifers treated for bovine respiratory disease.

	Times Treated for BRD				p-value
Item	0	1	2	3	Linear
Receiving Period					
Initial weight, lb	507	492	485	478	<0.01
Final weight, lb	613	593	564	540	<0.01
ADG, lb	3.06	2.89	2.29	1.79	<0.01
Grazing Period					
Initial weight, lb	611	593	564	549	<0.01
Final weight, lb	732	728	710	701	<0.01
ADG, lb	0.88	0.99	1.06	1.10	<0.01
Finishing Period					
Initial weight, lb	732	728	710	699	<0.01
Final weight, lb	1233	1217	1188	1182	<0.01
ADG, lb	3.99	3.92	3.84	3.86	0.16
Total Trial ADG, lb	2.45	2.45	2.38	2.38	0.10

Adapted from Montgomery et al., 2009.

During the grazing period, heifers previously treated for BRD compensated and gained faster than non-treated heifers. During the finishing period, heifers treated for BRD tended to gain slower than non-treated heifers. Finishing weight was significantly reduced as the number of treatments for BRD increased. Gains of heifers over the total trial tended to decreased with BRD treatment. These results suggest that losses in growth performance in cattle treated for BRD are difficult to overcome and that cattle previously treated for BRD may never fully compensate for lost growth performance.

The effects of treatment for BRD on the carcass characteristics of the heifers are shown in Table 2. Heifers treated for BRD during the receiving period had decreased hot carcass weights, fat thickness, ribeye areas, and marbling scores compared with heifers not previously treated for BRD. These carcass data are in agreement with 1999 Oklahoma research that showed steers previously treated for BRD had decreased hot carcass weights, fat thickness, and marbling scores.[2]

Table 2. Carcass characteristics of heifers treated for bovine respiratory disease.

	Times Treated for BRD				P-values	
Item	0	1	2	3	Linear	Quadratic
Hot carcass weight, lb	767	772	756	752		0.94
Fat thickness, in	0.53	0.46	0.46	0.43	<0.01	0.50
Ribeye area, in^2	14.37	14.48	14.03	14.01	0.08	0.73
Marbling score[a]	500	512	498	476	0.03	0.04

[a]400 to 499 = Select; 500 to 599 = Choice.
Adapted from Montgomery et al., 2009.

In summary, these data show that increased incidence of apparent BRD in cattle deceases both live performance and carcass quality compared with cattle not treated for apparent BRD.

Nutrient Composition of Grass-Fed vs. Conventional Beef

Texas Tech University and USDA-ARS researchers recently compared the nutrient composition of grass-fed beef with conventionally grain-fed beef.[3] Ground beef and strip steak samples were collected on three different occasions from 15 grass-fed beef producers representing 13 states. Similarly, conventional beef samples were collected from retail meat cases or university meat laboratories in three different regions of the country (Lubbock, TX; Brookings, SD; and Columbus, OH) on three different occasions. Subjective quality evaluation of the strip steaks indicated that grass-fed beef had more yellow fat, and less marbling than grain-fed beef. Less marbling in the grass-fed beef suggest that this beef would be less tender than grain-fed beef. Grass-fed strip steaks contained less total fat than grain-fed strip steaks but both sources were considered lean because their total fat content was 4.3% or less. For both ground beef and strip steaks, grass-fed beef contained significantly lower concentrations of monounsaturated fatty acids and greater concentrations of saturated fatty acids than grain-fed samples. There were no differences in cholesterol content or polyunsaturated fatty acid content between the two sources of beef. These researchers concluded that although the fatty acid composition of grass-fed and conventional grain-fed beef was different that conclusions on the possible effects on human health cannot be made without further research.

---

[1] Montgomery, S. P., J. J. Sindt, M. A. Greenquist, W. F. Miller, J. N. Pike, E. R. Loe, M. J. Sulpizio, and J. S. Drouillard. 2009. Plasma metabolites of receiving heifers and the relationship between apparent bovine respiratory disease, body weight gain, and carcass characteristics. J. Anim. Sci. 87: 328-333.

[2] Gardner, B. A., H. G. Dolezal, L. K. Bryant, F. N. Owens, and R. A. Smith. 1999. Health of finishing steers: Effects on performance, carcass traits, and meat tenderness. J. Anim. Sci. 77: 3168-3175.

[3] Leheska, J. M., L. D. Thompson, J. C. Howe, E. Hentges, J. Boyce, J. C. Brooks, B. Shriver, L. Hoover, and M. F. Miller. 2008. Effects of conventional and grass-feeding systems on the nutrient composition of beef. J. Anim. Sci. 86: 3575-3585.