

# BEEF CATTLE RESEARCH UPDATE

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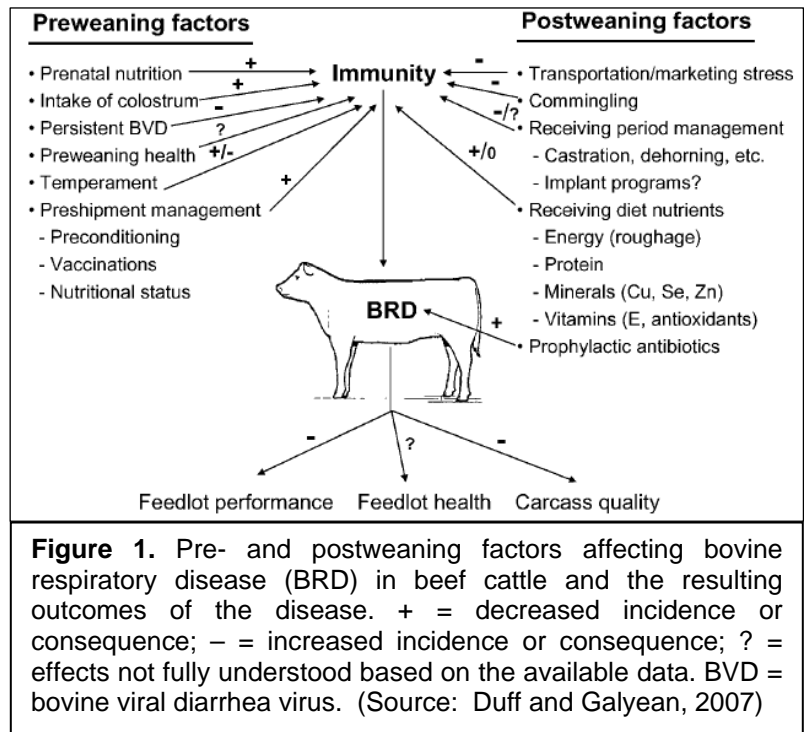
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## Recent Advances in Management of Highly Stressed, Newly Received Feedlot Cattle

Since highly stressed, newly received cattle present significant management challenges, University of Arizona and Texas Tech University researchers recently reviewed nearly 150 papers on this subject (Duff and Galyean, 2007).<sup>1</sup> It was noted that morbidity and mortality from bovine respiratory disease (BRD) in newly weaned/received cattle continues to be the most significant health problem facing the US beef cattle industry.

A recent survey of Kansa feedlots showed that death loss in feedlot cattle (both heifers and steers) has increased over the last decade (1992-2004).<sup>2</sup> Possibly, this has occurred because more light weight cattle (calf feds) are being fed now than 10 years ago.<sup>3</sup> BRD is ultimately a viral/bacterial disease, but numerous pre- and postweaning factors affect it (Figure 1). The Duff and Galyean review found that viral agents often predispose animals to bacterial infections with *Pasteurella (Mannheimia) haemolytica* being the organism most frequently isolated in cattle with BRD.



**Figure 1.** Pre- and postweaning factors affecting bovine respiratory disease (BRD) in beef cattle and the resulting outcomes of the disease. + = decreased incidence or consequence; - = increased incidence or consequence; ? = effects not fully understood based on the available data. BVD = bovine viral diarrhea virus. (Source: Duff and Galyean, 2007)

A USDA National Animal Health Monitoring System study of feedlots with 1,000 head or more capacity within the 12 leading feeding states showed that most feedlots believe that preconditioning is somewhat to extremely effective in decreasing morbidity and mortality in calves weighing less than 700 lbs.<sup>4</sup> A majority of the feedlots surveyed (67.2%) perceived that weaning calves at least 4 weeks prior to feedlot arrival is extremely or very effective in reducing morbidity or mortality. Approximately two-thirds of feedlots believed introduction to a feed bunk, respiratory vaccines given at least two weeks prior to weaning, and calves castrated and dehorned at least four weeks prior to shipping were extremely or very effective in reducing morbidity or mortality. Duff and Galyean concluded that preconditioning programs that include preweaning viral vaccinations along with castration can significantly reduce the incidence of BRD.

This review also concluded that metaphylactic antibiotic programs (preventative mass medication) continue to be effective; however, antibiotic resistance is a public concern. The use of alternatives to antibiotics such as direct-fed microbials (DFM) might be useful to improve performance and decrease morbidity of newly received beef calves. Data collected by member feedlots reporting to the VetLife Benchmark Performance Program showed that

feedyards (over 10 million cattle fed in 2003-2004) using DFM had increased average daily gains of 1.9 and 1.4% for steers and heifers, respectively, along with 1.9 and 3.9% improvements in feed efficiency.<sup>5</sup> These feedlot results tend to be consistent with a review of published research which suggested that feeding bacterial DFM to feedlot cattle increased daily gain 2.5 to 5% and improved feed efficiency 2%.<sup>6</sup> In addition to performance benefits, DFM appear to improve health and response to antibiotic treatments. The VetLife data showed that performance advantages with DFM were much greater in cattle with greater (more than \$20 per animal) processing and medical treatment charges. In a review of receiving period studies (average length of 30 days), feeding DFM increased gains by 13.2%, increased feed consumption 2.5% and improved feed efficiency by 6.3%.<sup>7</sup>

Duff and Galyean also reviewed the effects of nutritional status on BRD. This review showed that diets with an increased energy concentration achieved by decreasing the dietary roughage concentration may slightly increase the rate of BRD morbidity. However, these higher energy diets also increase gain, feed intake and gain efficiency compared with lower energy, greater roughage diets. A review and summary of several receiving trials conducted at the Clayton Livestock Research center during the 1970's and 1980's showed that morbidity from BRD only decreased slightly as dietary roughage concentration increased (20% increase in roughage concentration only decreased morbidity by 1.35%).<sup>8</sup> Whereas, average daily gain and dry matter intake were negatively affected by increasing roughage concentration (20% increase in roughage decreased gain by 0.39 lb and feed intake by 0.59 lb).

Duff and Galyean recommended that the extent to which performance and BRD morbidity are affected by dietary protein concentration needs further study, but low and high protein concentrations should probably be avoided. Several trace minerals (copper, selenium, and zinc) affect immune function, but the effects of supplementation on cattle performance and immune function in field trials are variable and inconclusive. Duff and Galyean also stated that although there is some evidence that organically complexed mineral sources might occasionally have different effects on performance and immune function, the effects seem too variable to recommend feeding particular sources. They also concluded that adding vitamin E to receiving diets (> 1,000 IU/hd/day) may be beneficial in decreasing BRD morbidity, but has little effect on performance.

In summary, even after decades of research, our ability to modify the incidence of BRD through nutritional manipulations is limited. Thus, Duff and Galyean recommended that diets for newly received cattle be formulated to adjust nutrient concentrations for low feed intake (due to stress) and to provide optimal performance during the receiving period.

### **Effect of Continuous versus Intermittent Transportation on Lambs**

Recent Texas A&M University research determined the efficacy of rest stops on the welfare of transported lambs.<sup>9</sup> This research evaluated three treatments: 1) transported for 22 hours (continuous), 2) transported for 8 hours, unloaded and rested for 6 hours, transported for 8 hours, unloaded and rested for 24 hours, transported for 6 hours (rested), and 3) remained in home pasture throughout study (control). During rest stops, lambs were provided feed and water. This trial took place during late July of 2003 in College Station, TX with a mean ambient temperature of 83°F (range of 65 to 103°F) and mean relative humidity of 59.9% (range of 29.1 to 92.4%). These researchers observed that access to feed and water during intermittent rest periods was sufficient to prevent rested lambs from losing

body weight during transport. In contrast, even at 8 days after transport, the continuous lambs had not fully recovered their body weight loss. It was concluded that rest stops eliminated the physiological indicators of food deprivation and maintained body weight but did not alleviate evidence of immunosuppression (immune system suppression), and 52 hours was required to complete the otherwise 22 hour long trip. Resting lambs during transport failed to alleviate transport stress that negatively affects immune response. In addition, it was noted that providing livestock with feed during transport to slaughter could be problematic due to the common recommendation that cattle be fasted 12 to 24 hours before slaughter to reduce the possibility of carcass contamination. The economic cost of extending a 22 hour transport to 52 hours also has to be considered.

- <sup>1</sup> Duff, G. C. and M. L. Galyean. 2007. Board-invited review: Recent advances in management of highly stressed, newly received feedlot cattle J. Anim. Sci. 85:823-840.
- <sup>2</sup> Babcock, A., R. Jones, and M. Langemeier. 2006. Examining death loss in Kansas feedlots. Kansas State Univ. Beef Cattle Research Report of Progress 959:46-52.
- <sup>3</sup> Thomson, D. U. 2005. Mortality in feedyard cattle. Plains Nutrition Council Spring Conference. Pub. No. AREC 05-20:1-8.
- <sup>4</sup> USDA-APHIS. 2000. Attitudes towards pre-arrival processing in U.S. Feedlots. Report N340.1100. USDA-APHIS, Fort Collins, CO. Available: <http://www.aphis.usda.gov/vs/ceah/ncahs/nahms/feedlot/feedlot99/FD99prearr.pdf>
- <sup>5</sup> Anderson, P. 2005. Direct fed microbial products seem to improve health of feedlot cattle. VetLife, Tech Talks. Available: [http://www.vetlife.com/support/techtalks/web/index.html?page=source%2Fhtml%2Fdealing\\_with\\_health\\_problems\\_in\\_early\\_weaned\\_calves.htm](http://www.vetlife.com/support/techtalks/web/index.html?page=source%2Fhtml%2Fdealing_with_health_problems_in_early_weaned_calves.htm).
- <sup>6</sup> Krehbiel, C. R., S. R. Rust, G. Zhang, and S. E. Gilliland. 2003. Bacterial direct-fed microbials in ruminant diets: Performance response and mode of action J. Anim. Sci. 81 (E. Suppl. 2):E120-E132. Available: [http://jas.fass.org/cgi/reprint/81/14\\_suppl\\_2/E120](http://jas.fass.org/cgi/reprint/81/14_suppl_2/E120)
- <sup>7</sup> Fox, S. M. 1988. Probiotics intestinal inoculants for production animals. Vet. Med. 83:806-830.
- <sup>8</sup> Rivera, J.D., M.L. Galyean, and W.T. Nichols. 2005. Review: Dietary roughage concentration and health of newly received cattle. Prof. Anim. Sci. 21:345-351.
- <sup>9</sup> Krawczel, P. D., T. H. Friend, D. J. Caldwell, G. Archer, and K. Ameiss. 2007. Effects of continuous versus intermittent transport on plasma constituents and antibody response of lambs J. Anim. Sci. 84:468-476.

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