Alpharma Beef Cattle Nutrition Symposium: "Parameterizing" Health and Performance Expectations of Feedlot Cattle

49 Practical relationships between morbidity and growth performance. V. R. Bremer[1], G. E. Erickson*[1], T. J. Klopfenstein[1], D. R. Smith[1], K. J. Hanford[1], R. E. Peterson[2], L. O. Burciaga-Robles[2], D. B. Faulkner[3], and C. R. Krehbiel[4], [1]*University of Nebraska*, *Lincoln*, [2]*Feedlot Health Management Services*, *Okotoks, Alberta, Canada*, [3]*University of Illinois*, *Urbana*, [4]*Oklahoma State University*, *Stillwater*.

Six trials suggested that bovine respiratory disease (BRD) depresses ADG and carcass finish. These studies did not account for DMI or G:F. Therefore, 5 new data sets were evaluated. Data (n = 978 lots; 276,116 cattle) from 2 Alberta, Canada feedlots with 0 to 70% BRD (CAN) were used to evaluate impact of BRD on performance. A subset (n = 33,074 cattle) had carcass data. A trial (OSU) was conducted with 193 heifers fed (6 heifers/pen) based on 0, 1, 2, 3, or 3+ BRD treatments during receiving, with incidence of 58%. Individual performance of 900 growing and 987 finishing cattle (UNL; 16 and 19% BRD treatment, respectively) were classified by time of BRD treatment at receiving, < 31 d on trial, > 30 d on trial, or no treatment. A third data set of 1,940 individual finishing cattle with 10% BRD treatment (UofI) were analyzed by time of BRD treatment. The CAN pen level closeout data indicate quadratic decreases ($P = 0.03$) in DMI and ADG and a trend for linear ($P = 0.08$) improvement in G:F as % of pen treated for BRD increased. The CAN carcass data indicates quadratic decreases ($P < 0.01$) in HCW, marbling score, and LM area, and a linear decrease ($P < 0.01$) in fat thickness as number of BRD treatments increased. In the OSU trial, feeding heifers based on BRD incidence at receiving indicates ADG linearly increased ($P = 0.01$), DMI was unchanged, and G:F increased as number of BRD treatments increased. Heifers treated 3 or more times required more d to reach a common end point. Growing cattle (UNL) treated > 30 d on trial had decreased ADG and G:F ($P < 0.01$) relative to cattle treated earlier or not at all. Finishing cattle (UNL) treated > 30 d on trial had similar DMI, ADG, and G:F ($P > 0.16$) as cattle treated earlier or not at all. The UofI cattle treated for BRD > 30 d on trial had decreased ($P < 0.01$) DMI and ADG and similar ($P = 0.51$) G:F as other BRD classes and required more d to reach a common end point. Cattle requiring treatment before 30 d on feed have similar performance to healthy cohorts; however, cattle requiring treatment after 30 d on feed may require increased d to reach a similar endpoint as healthy cohorts due to lower DMI and ADG, but G:F is unaffected.

Key Words: bovine respiratory disease, feed efficiency, growth

50 Predictability of feedlot cattle growth performance. M. L. Galyean*, N. DiLorenzo, J. P. McMeniman, and P. J. Defoor, *Texas Tech University*, *Lubbock*.

Predicting performance is vital to management and marketing decisions in commercial feedlots. Agreement between performance predicted from net energy equations or empirical regression relationships and actual performance is generally high, suggesting that factors affecting feedlot performance are fairly well documented. The challenge for feedlot managers is to predict performance with limited information at the start of the feeding period. Sex and initial BW are typically known with greatest certainty when cattle start on feed. Information on background and breeding is potentially important but less reliable. Relationships between initial BW, sex, and performance were evaluated using 3,363 pen records collected over 4 yr from 3 commercial feedlots in the Texas Panhandle. Mixed-model regression was used to account for random effects of feedlot × season × year and fixed effects of initial BW (range = 227 to 451 kg), sex (steer or heifer), and initial BW × sex ($P < 0.10$ for all variables evaluated). As expected, initial BW was positively related to DMI. With intercept and slope adjustments for sex, the R^2 was 0.72 for regression of DMI (adjusted for random effects) on initial BW. Similarly, with adjustments for random effects, regression on initial BW with sex adjustments accounted for 46, 82, and 81% of the variation in ADG, final shrunk BW, and HCW, respectively. Initial BW was negatively related to G:F ($R^2 = 0.22$). Analysis of a university data set (200 pens of steers; initial BW = 300 to 450 kg) indicated that adding ADG from d 0 to 70 of the feeding period increased R^2 for predicting HCW. Similarly, including early DMI data increased R^2 and decreased prediction error for DMI, indicating that updating predictions with interim performance data should prove beneficial. Adding data on previous health issues might improve predictions but is difficult to apply to pen settings. Environmental effects (e.g., severe heat or cold stress) can greatly affect performance and thereby decrease predictability. Overall, results suggest that initial BW has considerable value in predicting growth performance by feedlot cattle.

Key Words: feedlot cattle, initial body weight, predicted performance

51 Applying detection controls in assessing variance in feedlot cattle performance. R. A. Zinn*, *University of California*, *Davis*

ADG and DMI of feedlot cattle are predictable functions of gender, quality score (QS; values range from 1 to 3, increasing inversely with frame size), shrunk initial weight (SIW, kg), average shrunk live weight (SLW, kg), and dietary NEm and NEg (Mcal/kg):

$$\text{MFWsteer, kg} = 509.6 + 0.4697\ \text{SIW} - 46.54\ \text{QS},$$

$$\text{MFWheifer, kg} = 551.5 - 0.2482\ \text{SIW} + 0.00119\ \text{SIW}^2 - 39.84\ \text{QS},$$

$$\text{ADGsteer, kg} = 1.628 + 0.00287\ \text{SIW} - 0.00000107\ \text{SIW}^2 - 0.461\ \text{QS},$$

$$\text{ADGheifer, kg} = 1.265 + 0.00432\ \text{SIW} - 0.00000425\ \text{SIW}^2 - 0.410\ \text{QS},$$

$$\text{DMIsteer, kg} = (0.0606*((\text{SLW}*478/\text{MFW})^{0.75})*\text{ADG}^{0.905})/\text{NEg}) + (0.077\text{LW}^{0.75}/\text{NEm}),$$

$$\text{DMIheifer, kg} = (0.0618*((\text{SLW}*478/\text{MFW})^{0.75})*\text{ADG}^{0.905})/\text{NEg})+(0.077\text{LW}^{0.75}/\text{NEm}).$$

Variance in observed vs expected feedlot cattle performance occurs for many reasons, including: inaccurate measures of dietary DM percentage; estimation of dietary NE; unbalanced rations; improper feed mixing; inadequate grain processing; negative associative effects of dietary ingredients (i.e., too much fat); poor weighing conditions; 3) errors in recording live weight and DMI; transferences of cattle from one lot to another; failure to implant, or improper implanting technique; pen location and/ or orientation; inadequate pen, shade, manger, or drinker allocation; poor pen conditions; environmental extremes; poor health; etc. In this presentation, numerous examples using actual feedlot closeout data will be provided to illustrate how performance expectations (standards of performance) are used in fine-tuning feedlot management decisions.

Key Words: feedlot, cattle, performance