Parameter Updates in the Davis Growth Model for Growth, Intake, and Composition of Modern Angus-Cross Cattle. Meredith Harrison¹, James W. Oltjen⁰, Animal Science, University of California, Davis

Abstract: The Davis Growth Model is a dynamic model used to estimate body composition and growth in beef cattle by simulating total body DNA and protein turnover. Since model development and parametrization in the 1980s, the model has been re-structured to account for previous rate of protein accretion and prior nutrition. Original parameter estimates for alpha (maintenance constant, where net energy for maintenance is alpha x shrunk body weight⁰.⁷⁵; 0.08406) and K2 (protein synthesis rate constant; 0.0444) may not fit modern, heavier, more productive cattle. Angus-cross steers (n = 24; initial body weight 402 ± 12 kg) were fed using automated feed weight stations in group pens (8 steers/pen). Steers were fed a high energy ration twice daily, at 10% greater than the intake from the previous day. Steers were measured for hip height, body weight (BW), and ultrasonic measurements for ribeye area and back fat every 28 d until harvest (d 128). These measurements were used to calculate empty BW, empty body fat, and empty percent body fat for alpha and K2 estimates. Parameter estimates (± SD) were 0.12661 (0.01587) and 0.04919 (0.00220) for alpha and K2, respectively. Parameter estimates in the current study reflect a large increase in apparent maintenance. Maintenance requirements were moderately correlated with back fat thickness and feed conversion efficiency. Protein turnover had very strong correlations with ribeye area and feed conversion efficiency. Average feed conversion efficiency in the current study was 0.17. To evaluate parameter estimates, the model was re-run using the new values for alpha and K2. On average, the model underpredicted final empty body weight by 0.08 kg and empty body fat percent by 0.01%-units. Considering the relatively large variation among observed alpha values and the magnitude of increase compared with those previously reported, further research is required to determine an accurate alpha.

Keywords: beef cattle, energy, maintenance requirements

Effects of Supplemental Zinc Concentration and Source on Performance and Biomarkers of Immune Status in Receiving Steers. Dathan T. Smerchek¹, Jodi McGill¹, Stephanie L. Hansen¹, Iowa State University

Abstract: Weaned Angus-crossbred steers (n = 72; 626 ± 54 lbs) were enrolled in a 42-d receiving study evaluating trace mineral (TM) source and concentration on growth performance, immune, and TM status. Steers were housed in pens of 6, equipped with GrowSafe bunks to determine individual feed disappearance. Dietary treatments (n = 24 steers/treatment) included: 1) TM from an organic source (Availa4; Zinpro Corp., Eden Prairie, MN) at 7 g·steer⁻¹·d⁻¹; for 42 d (ORG); 2) ORG for entire 42-d plus AvailaZn to provide 1,000 mg Zn·steer⁻¹·d⁻¹ for first 14 d (ORG+Z); 3) inorganic TM sources to match TM concentration in ORG (ING) for 42-d. Cattle were weighed on d -1, 0, 14, 41, and 42. Data were analyzed using Proc Mixed with fixed effect of treatment and steer as experimental unit. Initial BW was covariate for growth performance. Final BW and overall ADG did not differ (P ≥ 0.19). However, overall DMI tended to differ (P = 0.06) and G:F was greater (P = 0.04) in ORG+Z than ING, with ORG intermediate. Plasma Zn increased from d 0 to d 14, while d 14 and d 42 did not differ (Day; P = 0.02) and was unaffected by treatment (p value). Based on repeated measures, plasma Cu concentration was greater (P = 0.06) in ING than ORG+Z, while ORG was intermediate and plasma Cu concentrations decreased over time (Day; P = 0.01). Frequency of total circulating NK and CD8 T cells measured on d 0, 14, 42 did not differ (P ≥ 0.07). Markers of activation (CD16, CD44 and CD8) on NK cells measured on d 14 differed by treatment (P ≤ 0.05). In this study, organic TM supplementation improved feed efficiency in received weaned beef steers and TM supplementation influenced markers of immune function.

Keywords: cattle, receiving, zinc