



# BEEF CATTLE RESEARCH UPDATE

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## **Production and Economic Effects of Developing Heifers on Three Different Levels of Single Stair-Step Nutrition Programs**

Replacement heifer development can significantly impact the profitability of a beef cattle operation. Links between nutrition and reproductive success in heifers have been demonstrated; however, achieving a high plane of nutrition is costly, and reproductive success remains uncertain, making heifer development expensive and risky.<sup>1</sup> It has been proposed that development could be optimized by using nutritionally efficient strategies to manage plane of nutrition without negatively impacting reproduction. Texas A&M University research evaluated the production and economic effects of developing replacement heifers on three different levels of single stair-step nutrition programs.<sup>1</sup>

In this study, 85 heifers (average age of 340 days and weighing 461 lb) were randomly assigned to 1 of 3 treatments: High, programmed to gain 2.03 lb/day, Medium, programmed to gain 1.00 lb/day, and Low, programmed to gain 0.00 lb/day for 49 days. After this period, all heifers were then programmed to gain 3.00 lb/day for the next 41 days. Heifers were individually fed a common diet (42% cracked corn, 26% dried distillers grains, 26% alfalfa hay, and 6% molasses) that contained 15% crude protein and ~77% TDN using an electronic system (Calan Gates) at varying levels to achieve programmed gain. Heifers were synchronized beginning day 90 of the trial and fixed-time artificially inseminated on day 98, followed by 56 day exposure to bulls. Pregnancy rates were determined on day 154.

These researchers reported that total input costs were different among treatments ( $P < 0.01$ ). The cost of development on the Medium or Low treatments was \$10 or \$23 less per heifer, respectively, than High (\$95.35). However, body weight and number pubertal on day 90 were not different ( $P \geq 0.10$ ). Pregnancy rates on day 154 were 79, 96, and 82% for High, Medium, and Low respectively, but were not different ( $P = 0.21$ ). Thus, developing heifers on a lower plane of nutrition decreased cost per pregnancy without apparent negative effects on reproductive success. They noted that the Medium strategy was the optimal development program based on cost per pregnancy. However, additional research is needed to confirm the effects on reproductive outcomes.

## **Effect of Removing Tylan from Finishing Diets with Increasing Roughage Concentration on Finishing Cattle**

Liver abscesses in feedlot cattle are a cause of decreased performance and reduced carcass value. Loss in carcass value is due to not only to the abscessed liver being condemned, but also due to trim loss associated with the condemned liver. According to 2016 National Beef Quality Audit Report<sup>2</sup>, 30.8% of livers were condemned at slaughter as compared to 20.9% reported in the 2011 National Beef Quality Audit.<sup>3</sup> Tylosin phosphate (Tylan, Elanco Animal Health) is an antibiotic that is commonly fed to feedlot cattle to decrease the incidence of liver abscesses. Due to regulatory changes pertaining to the use of in-feed antibiotics in cattle production, there is growing interest in alternatives to antibiotics for liver abscess control. Since liver abscesses are associated with acute or

chronic acidosis, feeding elevated levels of roughage should reduce the incidence of liver abscesses.<sup>4, 5</sup>

Cactus Feeders conducted a trial utilizing 3,340 beef steers (853 lb initial body weight, BW) to evaluate the effects of tylosin removal from finishing diets with increasing roughage concentration.<sup>6</sup> The following dietary treatments were evaluated: 1) 7.1% corn stalks with tylosin, 2) 7.1% corn stalks with no tylosin, 3) 13.1% corn stalks with no tylosin, or 4) 19.1% corn stalks with no tylosin. Corn stalks replaced steam flaked corn on a dry matter basis.

These researchers reported that increased roughage resulted in a linear increase in dry matter intake (DMI,  $P < 0.001$ ) while linearly reducing final BW, average daily gain, and Gain to Feed ratio ( $P \leq 0.001$ ). Final hot carcass weight (HCW) was similar between the two 7.1% corn stalk rations ( $P = 0.49$ ). However, HCW linearly decreased as roughage increased (904, 900, or 884 lb, respectively;  $P < 0.001$ ). Tylosin inclusion reduced liver abscess occurrence by 32.1% (13.03 vs. 19.18%,  $P = 0.001$ ). Liver abscess occurrence decreased linearly with increased roughage (19.18, 11.88, or 14.40%, respectively;  $P = 0.009$ ). However, increased roughage did not reduce liver abscess severity ( $P \geq 0.13$ ).

These authors concluded that this data “indicated that replacing steam flaked corn with corn stalks in diets without tylosin may reduce liver abscess occurrence but not severity. However, decreased dietary energy led to increased DMI and lighter HCW in cattle fed to the same days on feed.”

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- <sup>1</sup> Stribling, E. J., T. A. Wickersham, R. C. Cardoso, and J. E. Sawyer. 2018. Production and Economic Effects of Developing Heifers on Three Different Levels of Single Stair-Step Nutrition Programs. *J. Anim. Sci.* 96 (Suppl. 1): 49-50 (Abstr.).
  - <sup>2</sup> NBQA. 2017. National Beef Quality Audit Executive Summary. Available: [http://www.bqa.org/Media/BQA/Docs/2016nbqa\\_es.pdf](http://www.bqa.org/Media/BQA/Docs/2016nbqa_es.pdf).
  - <sup>3</sup> McKeith, R. O., G. D. Gray, D. S. Hale, C. R. Kerth, D. B. Griffin, J. W. Savell, C. R. Raines, K. E. Belk, D. R. Woerner, J. D. Tatum, J. L. Igo, D. L. VanOverbeke, G. G. Mafi, T. E. Lawrence, R. J. Delmore, L. M. Christensen, S. D. Shackelford, D. A. King, T. L. Wheeler, L. R. Meadows, and M. E. O'Connor. 2012. National Beef Quality Audit-2011: Harvest-floor assessments of targeted characteristics that affect quality and value of cattle, carcasses, and byproducts. *J. Anim. Sci.* 90: 5135-5142.
  - <sup>4</sup> Reinhardt, C. D. and M. E. Hubbert. 2015. Review: Control of liver abscesses in feedlot cattle: A review. *Prof. Anim. Sci.* 31:101-108.
  - <sup>5</sup> Galyean, M. L. and J. D. Rivera. 2003. Nutritionally related disorders affecting feedlot cattle. *Can. J. Anim. Sci.* 83:13-20.
  - <sup>6</sup> Holland, B., A. Word, P. Defoor, K. Karr, and C. Maxwell. 2018. The effect of removing tylosin from finishing diets with increasing roughage concentration on growth performance, carcass characteristics, and prevalence of liver abscesses of finishing cattle. *J. Anim. Sci.* 96 (Suppl. 3):406 (Abstr.).

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