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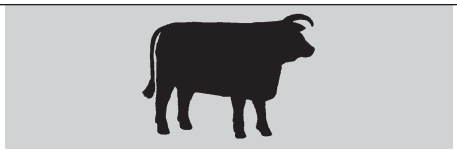

Effect of increasing initial implant dosage on feedlot performance and carcass characteristics of long-fed steer and heifer calves[1,2]

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ABSTRACT

Three experiments evaluated initial implant strategies for finishing cattle. In Exp. 1, heifers (n = 1,405; initial BW = 282 kg) were given (1) Revalor-IH followed by Revalor-200 (REV-IH/200), (2) Revalor-H followed by Revalor-200 (REV-H/200), or (3) Revalor-200 followed by Revalor-200 (REV-200/200). Intake, ADG, and G:F were not affected (P ≥ 0.14) by implant strategies, nor were HCW and LM area (P ≥ 0.16). Percent USDA Choice was greater (P < 0.01) for Rev-IH/200 compared with Rev-H/200 and Rev-200/200. Experiment 2 used steers (n = 1,858; initial BW = 250 kg) given (1) Revalor-IS reimplanted with Revalor-200 (Rev-IS/200), (2) Revalor-XS followed by Revalor-IS (Rev-XS/IS), (3) Revalor-XS followed by Revalor-S (Rev-XS/S), or (4) Revalor-XS followed by Revalor-200 (Rev-XS/200). Implanting strategies did not affect (P ≥ 0.32) DMI or G:F. Carcass traits were not different (P ≥ 0.18) among treatments, except steers implanted with Rev-XS/200 had greater (P < 0.01) LM area. In Exp. 3, steers (n = 1,408; initial BW = 305 kg) were given (1) Rev-IS/200, (2) Rev-200/200, or (3) Rev-XS/200. Gain and G:F did not differ (P ≥ 0.36) among the 3 implant strategies, nor did HCW or marbling score (P ≥ 0.15). Steers given Rev-XS/200 had greater (P < 0.01) LM area and decreased (P ≤ 0.05) 12th-rib fat and YG compared with Rev-200/200 and Rev-IS/200. Using Rev-200/200 and Rev-XS/200 increased (P = 0.03) USDA Select compared with Rev-IS/200. Using greater-initial-dose implant strategies may not affect ADG or G:F but appears to increase leanness.

Key words: carcass characteristic, finishing performance, implant strategy

INTRODUCTION

Growth-promoting implants provide considerable improvements in production efficiencies to the beef cattle industry (Folmer et al., 2009; Nichols et al., 2014). Despite these improvements, the majority of implants only last 60 to 120 d, depending on the dose, before they are no longer effective. Because many cattle require more than 120 d to reach slaughter weight, reimplanting becomes an

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important management strategy to improve animal efficiency (Preston, 1999). For instance, cattle implanted with 2 consecutive combination implants containing trenbolone acetate (**TBA**) and estradiol-17β (**E2**) have demonstrated a 20.0% increase in ADG and a 13.5% improvement in BW gain efficiency compared with nonimplanted cattle (Duckett and Pratt, 2014). Implanting strategies use different combinations of implants based on cattle, age, weight, sex, production goals, and estimated days on feed to target gain efficiency, lean meat yield, and carcass quality (Mader, 1997; Reinhardt, 2007; Johnson et al., 2013). With demand for increased gain efficiency and lean meat yield, usage of greater-dose implants has increased; however, data are limited on the use of these implant combinations in long-fed calves over 170 d. Therefore, the objectives of these experiments were to compare feedlot and carcass performance of long-fed heifers and steers receiving different aggressive initial implant strategies in commercial feedlots.

MATERIALS AND METHODS

The following experiments were conducted in collaborations between Merck Animal Health (De Soto, KS), Cattlemen's Nutrition Service LLC (Lincoln, NE), Bos Terra LP. (Hobson, MT), Innovative Livestock Services Inc. (Great Bend, KS), and the University of Nebraska–Lincoln. Research was conducted at commercial facilities and followed the guidelines stated in the *Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching* (FASS, 2010).

Exp. 1

Animals and Treatments. British and British × Continental heifer calves (n = 1,405; 282 ± 3 kg of initial BW) were fed at a commercial feedyard in central Nebraska from May 2011 to November 2011 (days on feed across blocks averaged 173 d). Heifers were sourced from several sale barns located in Oklahoma. Treatments were (1) Revalor-IH (80 mg of TBA + 8 mg of E2; Merck Animal Health, Madison, NJ) at initial processing followed 89 d later by Revalor-200 (200 mg of TBA + 20 mg of E2; Merck Animal Health; **REV-IH/200**); (2) Revalor-H (140 mg of TBA + 14 mg of E2; Merck Animal Health) at initial processing followed 89 d later by Revalor-200 (**REV-H/200**); or (3) Revalor-200 at initial processing followed 89 d later by Revalor-200 (**REV-200/200**).

Heifers were allotted randomly to pen by arrival block (n = 6) by sorting every 2 heifers into 1 of 3 pens before initial processing. Implant treatments were assigned randomly to pen (n = 1) within a block, for a total of 18 pens. After heifers were randomized into their respective pens, each pen was group weighed on a platform scale before processing to establish pen initial BW. Only products approved by the USDA and United States Food and Drug Administration were administered according to label directions during this study. At processing, heifers received a combination vaccine (Bovi-Shield Gold, Zoetis Inc., Florham Park, NJ) against infectious bovine rhinotracheitis (**IBR**) virus, bovine virus diarrhea (**BVD**) virus types 1 and 2, parainfluenza 3 (**PI_3**) virus, and bovine respiratory syncytial virus (**BRSV**). Additionally, heifers received an oral dose of 10% fenbendazole solution (Safe-Guard, Merck Animal Health) for treatment of internal parasites, an injection of 1% moxidectin (Cydectin, Boehringer Ingelheim/Vetmedica St. Joseph, MO) for treatment of external parasites, and an implant based on the specified treatment assigned. At reimplant (d 90), all pens within a block were brought to the processing facility, reimplanted with Revalor-200, and pen weighed.

Cattle were housed in 18 open lots with earthen mounds. Each animal had ad libitum access to clean water and their respective diet. Cattle were started on feed with a 56% concentrate, 44% roughage diet. Over a 26-d period, 2 intermediate diets were used to transition cattle to a finishing diet. The finishing diet consisted of 49.1% dry-rolled corn, 40% wet distillers grains plus solubles, 6.5% mixed hay, and 4.4% supplement (DM basis). The supplement was formulated to provide 300 mg per heifer daily of monensin (Rumensin; Elanco Animal Health, Indianapolis, IN), 90 mg per heifer daily of tylosin phosphate (Tylan; Elanco Animal Health), and 0.45 mg per heifer daily of melengestrol acetate (Heifermax; Elanco Animal Health). All heifers were fed zilpaterol hydrochloride at 8.33 mg/kg of DM (Zilmax; Merck Animal Health) for 20 d followed by a 3-d withdrawal before slaughter. Heifers were fed twice daily at approximately 0700 and 1300 h in concrete, fence-line feedbunks, with feedbunks visually evaluated each morning. Feedbunks were managed to allow trace amounts of feed to remain in the bunk before feed delivery. Diet samples were obtained monthly from feedbunks and composited for nutrient analysis (Servi-Tech Laboratories, Hastings, NE). Diets provided protein and minerals to meet or exceed NRC (1996) requirements and contained greater than 1.45 Mcal/kg of NE_g.

Carcass Evaluation. Slaughter date was determined based on reimplant weight. Prior to shipping for slaughter, heifers from each pen were group weighed on platform scales and shrunk 4% to calculate DP and final live BW. After weighing, heifers were immediately loaded onto trucks and transported 201 km to a commercial abattoir (JBS, Grand Island, NE). Carcass-adjusted final BW was calculated as average HCW divided by the average DP of 65.85% across all animals. Carcass data were collected by personnel from West Texas A&M University (Canyon, TX). Individual HCW were collected at slaughter, and following a 24-h chill, 12th-rib fat thickness, LM area, DP, KPH, marbling scores, percent USDA QG, and percent USDA YG were collected for each pen. Yield grade was calculated using the equation of YG, where YG