Evaluation of Two Implant Strategies, Revalor-XH or a Combination Revalor-IH/Revalor-200 on Heifer Growth Performance and Carcass Characteristics

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Summary and Implications

A commercial feedlot trial examined effects of two implant strategies (Revalor-IH on d 1 and re-implanted with Revalor-200 on d 101 or Revalor-XH on d 1) on growth performance and carcass characteristics of heifers fed 183 days. There were no differences between implant strategies for final body weight, dry matter intake, and average daily gain. Heifers implanted with the combination IH/200 treatment had improved carcass-adjusted feed conversion, greater LM area, and lower calculated yield grade compared to heifers implanted with XH. The response in growth performance between the two implant strategies suggests that the partially-coated Revalor-XH implant can be used in place of a more aggressive implant strategy when heifers are fed to similar days.

Introduction

Heifers given increased trenbolone acetate and estradiol tend to respond with increased growth performance and hot carcass weight. Heifers typically have reduced growth performance compared to steers due to increased fat deposition at the same age. To improve growth performance of heifers, feedlots may utilize aggressive implant protocols. Implanting once at the beginning of the feeding period with a long-lasting, delayed-release implant (Revalor-XH) may reduce potential stressors. The objective of this study was to evaluate implanting heifers with a partially coated Revalor-XH implant on d 1 compared to a more aggressive implant strategy of Revalor-IH on d 1 followed by Revalor-200 at a target of 80 d on terminal implant. Finishing heifer performance and carcass characteristics were measured.

Procedure

Crossbred heifers [n = 870; initial body weight (BW) = 710; SD = 19.6 lb] were utilized in a finishing study conducted at Hi-Gain Feedlot near Farnam, NE. The study had a generalized randomized block design with three blocks and two replications per block. Heifers were sourced from Nebraska (two replications), North Dakota and Montana (two replications), and Canada (2 replications). Heifers were fed for an average of 183 d (range 181–184 d) from May 2018 to November 2018. Treatments were: Revalor-IH on d 1 (80 mg trenbalone acetate (TBA)/8 mg estradiol (E2), noncoated, Merck Animal Health DeSoto, KS) and re-implanted with Revalor-200 on d 101 (200 mg TBA/20 mg E2, noncoated (IH/200), Merck Animal Health) or Revalor-XH on d 1 (200 mg TBA/20 mg E2, partially coated (XH); Merck Animal Health). Revalor-XH contains four uncoated pellets (80 mg TBA and 8 mg E2) for immediate release and six coated pellets (120 mg TBA and 12 mg E2) to release approximately 70 to 80 d after implanting.

Heifers were randomly assigned to pen (n = 12) by sorting every two heifers into one of two pens within replication prior to processing. Heifers were enrolled in the study over two days. Heifers were processed, pen weighed, and assigned to treatment in a single event. Animals were blocked based on origin source. Each block contained an equal number of pens per treatment. Pens were assigned randomly to treatment with 6 pens per treatment and an average of 73 animals per pen. Prior to enrollment, all heifers were checked for pregnancy. If pregnant, heifers were removed from the pool of qualified animals. At processing, heifers received their assigned implant, vaccine for protection against bovine rhinotracheitis virus and bovine viral diarrhea types one and two viruses (Bovi-shield Gold 5; Zoetis, Florham Park, NJ), external parasite control via dosing with 7 cc of moxidectin (Cydectin, Bayer Animal Health, Germany), and internal parasite control via drenching with 17 cc of fenbendazole (Safe-Guard, Merck) oral suspension. Implants were placed in the middle-third of the ear under the skin. Heifers assigned to IH/200 treatment were re-implanted 101 d after initial implanting. At reimplant, all implants were placed in the opposite ear of the initial implant.

Cattle were housed in open lots, with similar square feet allocated per animal across all pens, and ad libitum access to water and feed. Diets were constant across all treatments. All animals were adapted to a common finishing diet over a 27-d step up period consisting of four adaption diets. The finishing ration consisted of 65.3% steam-flaked corn, 18.0% wet distillers grains plus solubles, 4.5% mixed hay, 5.5% corn silage, 1.7% tallow, and 5.0% supplement (DM basis). Supplement was delivered daily via micro machine and formulated to provide 30 g/ton DM of Rumensin (Elanco Animal Health), 8.9 g/ton DM Tylan (Elanco Animal Health), 0.45 mg/hd/d of melengestrol acetate (MGA, Zoestis) and 250 mg/hd/d DM of Optaflexx (Elanco Animal Health). The nutrient composition of the finishing diet contained 14.6% crude protein, 6.6% crude fat, 1.04 Mcal/lb NEm, 0.72 Mcal/lb NEg, 0.7% Ca, 0.4% P, 0.7% K, and 0.2% S (DM basis). Optaflexx was targeted to be fed for 29 d at the end of the feeding period with a two d withdraw prior to slaughter. Diet samples were taken monthly and sent to a commercial laboratory (Servi-Tech Laboratories, Hastings, NE) for feed composition (DM, CP, NEm, NEg, Ca, P, K, and S). Weekly feed ingredient samples were taken to determine DM on site.

Cattle were scheduled for slaughter at approximately 183 d (range 181–184 d) on feed. Cattle were pen weighed prior to loading onto the truck to be shipped. Cattle were harvested at varying days on feed. Replications one and two were harvested at 181 days on feed and replications three,

Table 1. Performance and carcass characteristics of heifers implanted with Revalor-XH or Revalor-IH/200

	Treatment[1]			
Item	Rev-IH/200	Rev-XH	SEM	F-Test
Head Count	435	435	—	—
Days on Feed	183	183	—	—
Animals Removed, %	3.21	2.59	0.901	0.64
Death Loss, %	1.15	0.95	0.509	0.79
Live Performance				
Initial BW, lb	713	708	3.3	0.36
Final BW[2], lb	1393	1385	6.8	0.43
DMI, lb/d	23.9	24.2	0.18	0.33
ADG, lb	3.72	3.70	0.027	0.62
F:G	6.45	6.54	—	0.23
Carcass-Adjusted Performance				
Final BW[3], lb	1394	1380	7.3	0.21
ADG, lb	3.73	3.67	0.026	0.17
F:G	6.41	6.58	—	0.03
Carcass Characteristics				
HCW, lb	880	871	4.7	0.22
Dressing, %	63.14	62.87	0.17	0.28
LM area, in²	13.7	13.0	0.14	<0.01
Marbling[4]	512	497	5.6	0.11
12th rib fat, in	0.75	0.74	0.009	0.32
Calculated YG[5]	3.75	3.89	0.025	<0.01

[1]Treatments included: 1) Revalor-IH on d 1 (80 mg trenbalone acetate (TBA)/8 mg estradiol (E2), noncoated, Merck Animal Health DeSoto, KS) and re-implanted with Revalor-200 on d 101 (200 mg TBA/20 mg E2, noncoated (IH/200), Merck Animal Health); 2) Revalor-XH on d 1 (200 mg TBA/20 mg E2, partially coated (XH); Merck Animal Health). Revalor-XH contains four uncoated pellets (80 mg TBA and 8 mg E2) for immediate release and six coated pellets (120 mg TBA and 12 mg E2) to release approximately 70 to 80 d after implanting.

[2]Final BW is the average pen weight shrunk four percent. Subsequent ADG and F:G are calculated from shrunk final BW.

[3]Carcass-adjusted final BW was determined by dividing average HCW per treatment by the average dressing percent of 63.01%.

[4]USDA marbling scores. 400 = small, 500 = modest, 600 = moderate.

[5]YG = 2.50 + (2.5 * 12th-rib fat depth, in) + (0.2 * 3.0 KPH fat, %) + (0.0038 * HCW, lbs)—(0.32 * LM area, in²) where KPH fat was assumed to be 3.0 %.

four, five, and six were harvested at 184 days on feed. All heifers were harvested at a commercial abattoir (JBS Swift and Co., Grand Island, NE). Individual HCW was collected at slaughter. Following a 24-hr chill, 12th-rib fat depth, LM area, marbling, USDA quality grade, and USDA yield grade were collected from camera data. There were 11 carcasses removed from analysis due to missing carcass data or misidentified individual animal IDs. Therefore, carcass data were analyzed with 414 and 420 heifers in IH/200 and XH, respectively.

Performance and carcass data were analyzed as a generalized randomized block design using the MIXED procedure of SAS (9.4, SAS Institute Inc., Cary, NC). Treatment and block were fixed effects. The model included implant treatment and block. Pen was the experimental unit. Treatment averages were calculated using the LSMEANS option of SAS. Frequency data, such as USDA quality grade and yield grade distributions, were analyzed using the GLIMMIX procedure of SAS using a multinomial approach. Treatment differences were significant at $\alpha \leq 0.05$ and tendencies were discussed when $0.05 \leq \alpha \leq 0.10$.

Results

There were nine heifers that died over the course of the study. Sixteen heifers were removed from the trial due to respiratory disease, foot rot, or body injury. No differences ($P > 0.64$; Table 1) were observed between implant treatments for percent removed and mortality.

There were no differences ($P > 0.23$) in live final BW, dry matter intake (DMI), average daily gain (ADG), and feed conversion (F:G) due to implant treatment. There were no differences ($P > 0.17$) in carcass-adjusted final BW and ADG among implant treatments. Although not significant, carcass-adjusted ADG was 1.63% greater for heifers implanted with the combination IH/200 compared to heifers implanted with XH. Carcass-adjusted feed conversion improved 2.58% ($P = 0.03$) for heifers given IH/200 compared to heifers implanted with XH.

There were no differences ($P > 0.22$) in HCW, dressing percent, and 12th rib fat thickness among treatments. Heifers implanted with IH/200 had greater ($P = 0.01$) LM area compared to heifers implanted with XH. Calculated yield grade was greater ($P = 0.01$) for heifers given XH compared to heifers implanted with IH/200. The distribution of USDA yield grades tended to be significantly different ($P = 0.08$; Table 2) among treatments. The distribution of USDA quality grades was not different ($P = 0.35$) among treatments.

Conclusion

Overall, growth performance and carcass characteristics were relatively similar among IH/200 and XH treatments. However, heifers given IH/200 had improved carcass-adjusted feed efficiency, LM area, and calculated yield grade compared to heifers given XH. These data suggest when heifers are fed the same number of days the combination IH/200 implants can improve animal performance compared to the XH implant.

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Table 2. Quality grade and yield grade distribution of heifers fed for an average of 183 d implanted with Revalor-IH/200 or Revalor-XH

	Treatment[1]		
Item	Rev-IH/200	Rev-XH	*P*-Values
Quality Grade[2], %			
Prime	4.9	4.7	0.35
Upper Choice	45.2	43.3	
Choice	35.8	40.4	
Select	13.8	11.2	
Standard	0.2	0.3	
Yield Grade Distribution[2], %			
YG 1	0.9	0.9	0.08
YG 2	12.1	5.4	
YG 3	38.6	40.9	
YG 4	39.2	44.1	
YG 5	9.1	8.7	

[1]Treatments included: 1) Revalor-IH on d 1 (80 mg trenbalone acetate (TBA)/8 mg estradiol (E2), noncoated, Merck Animal Health DeSoto, KS) and re-implanted with Revalor-200 on d 101 (200 mg TBA/20 mg E2, noncoated (IH/200), Merck Animal Health); 2) Revalor-XH on d 1 (200 mg TBA/20 mg E2, partially coated (XH); Merck Animal Health). Revalor-XH contains four uncoated pellets (80 mg TBA and 8 mg E2) for immediate release and six coated pellets (120 mg TBA and 12 mg E2) to release approximately 70 to 80 d after implanting.

[2]All numbers are expressed as percentages. The yield grade and quality grade values represent the proportion of carcasses within each group that received a yield and quality grade.