Evaluation of Revalor-XH for beef heifers fed different days on feed

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Summary with Implications

Heifers were treated with either no implant, an initial implant of Revalor-200 and re-implanted with Revalor-200, or Revalor-XH and assigned to one of four serial slaughter harvests at 151, 165, 179, and 193 days on feed to determine the effects on feedlot performance and carcass characteristics. Implanting heifers increased final BW, ADG and HCW while decreasing marbling score and improving feed efficiency compared to non-implanted heifers. Increasing days on feed decreased ADG while increasing feed efficiency, HCW, fat thickness, marbling score, and calculated yield grade. By increasing HCW sold, implanting revenue can be maximized, assuming added risk for YG discounts.

Introduction

Implanting beef cattle improves ADG and feed conversion, while decreasing marbling score and yield grade compared to non-implanted cattle at similar days on feed. Recently, market conditions have resulted in cattle finished with additional days on feed resulting in heavier carcass weights. However, as carcass weight increases, the percentage of carcasses discounted due to excess weight and increased yield grade due to fat deposition also increases. This industry change has encouraged the use of more aggressive implant strategies to add carcass weight while decreasing the chance of higher yield grade. Implant strategies have become more performance-based by increasing the dose of implant given initially, and/or by administering a long acting implant with increased payout of the implant. Most implant studies conducted in the past have utilized steers whereas this trial will focus on heifers fed in confinement for slaughter. The objective of the trial was to determine the effects of implant strategy (no implant, Revalor 200 on d 1 followed by Revalor 200 on d 100 or Revalor XH on d 1) and days on feed.

Procedure

The experiment was arranged in a 3 x 4 factorial design utilizing 720 crossbred calf-fed heifers (initial BW = 612 ± 56 lb) at the Panhandle Research and Extension Center, Mitchell, NE. Heifers were assigned randomly to one of twelve treatments consisting of three implant strategies and four serial harvest groups. Implant strategies included a non-implanted negative control (NON), a re-implant strategy providing an initial implant containing 200 mg trenbolone acetate and 20 mg estradiol (Revalor-200, Merck Animal Health, Madison, NJ) followed by another implant containing 200 mg trenbolone acetate and 20 mg estradiol (Revalor-200) at 100 days on feed (200), and a new, longer acting implant containing 200 mg trenbolone acetate and 20 mg estradiol (Revalor-XH) at day 0 (XH). The Revalor-XH implant contained ten pellets each with 20 mg trenbolone acetate and 2 mg estradiol, including four uncoated pellets (immediate release) and six coated pellets that begin to release approximately 70 days after implantation. The four serial harvest groups were determined based on time point at which the heifers reached appropriate market condition, in which serial harvest groups would be marketed at 14 d intervals thereafter. Based on the performance and time at which marketing condition was achieved, serial harvest groups consisted of heifers fed to 151 (NORMAL), 165 (PLUS14), 179 (PLUS28), and 193 (PLUS42) days on feed. The trial utilized 72, 10 head pens allowing for six replications per simple effect treatment (60 heifers per trt).

Heifers were limit fed at 2% BW per day for 5 consecutive days prior to a 2-d weight collection to minimize variation in gut fill. On d 0 of the trial, individual BW was recorded, carcass ultrasound images were collected, and heifers were assigned randomly to one of twelve treatments within three initial start date blocks. Based on treatment assigned, heifers were administered their respective implant while in the chute on d 0. Each treatment was represented equally within start date block with two replications per block for a total of 24 pens (240 heifers). On d 1 of the trial, a pen weight was recorded to serve as the second d weight collection.

The common finishing ration fed to all heifers consisted of 58% dry-rolled corn, 7% corn silage, 4% wheat straw, 25% wet distillers grains plus solubles, and 6% supplement (DM basis). Heifers were fed once daily and provided *ad libitum* access to feed and water throughout the trial.

All data were analyzed using the GLIMMIX procedure of SAS (SAS Institute, Inc., Cary, N.C.). Pen was the experimental unit and start block was included as a fixed effect. The model included implant treatments, serial harvest, and the interaction of implant and serial harvest as fixed effects. Due to a significant difference in initial pen weights among days on feed treatment ($P = 0.01$), initial pen weight was considered a covariate and included in the model if significant. Orthogonal contrasts were used to test linear, quadratic, and cubic effects of serial harvest for heifers.

Results

During the trial, twelve heifers were removed from the study. Six heifers were removed due to death while six were removed due to poor performance, lameness, or abscess issues. These heifers were not included in the statistical analyses. Initial start block was not significant ($P \geq 0.24$) for feedlot performance or carcass characteristics

Table 1. Feedlot and carcass performance for heifers implanted with no implant, Revalor 200 on d 1 and re-implanted with Revalor 200 on d 100, or Revalor XH on d 1 and fed to either 151, 165, 179, or 193 days on feed.

	Treatments[1]															
	NORMAL			PLUS14			PLUS28			PLUS42				*P*–value[2]		
Item,	NON	200	XH	NON	200	XH	NON	200	XH	NON	200	XH	SEM	Inter	Trt	Serial
Initial BW, lb	627	610	608	610	620	605	621	623	624	627	637	630	11	0.53	0.58	0.01
DMI, lb/d	25.8	25.6	25.9	25.6	25.8	25.7	25.4	25.9	26.5	25.7	25.8	26.4	0.3	0.70	0.11	0.72
Live final BW, lb[3,4]	1217	1256	1278	1251	1305	1276	1273	1333	1340	1330	1367	1356	14	0.27	0.03	< 0.01
Live ADG, lb/d[4]	3.95	4.23	4.35	3.82	4.15	3.98	3.65	3.98	4.02	3.68	3.88	3.81	0.10	0.20	0.05	< 0.01
Live F:G[4]	6.53	6.05	5.95	6.70	6.22	6.46	6.96	6.51	6.59	6.98	6.65	6.93	-	0.34	0.02	< 0.01
Carcass adjusted final BW, lb[4,5]	1201	1243	1242	1247	1302	1264	1292	1349	1365	1349	1383	1386	13	0.32	< 0.01	< 0.01
Carcass adjusted ADG, lb/d[6]	3.84	4.13	4.12	3.79	4.13	3.90	3.75	4.06	4.15	3.78	3.95	3.97	0.08	0.32	< 0.01	0.18
Carcass adjusted F:G[4]	6.72	6.20	6.29	6.75	6.25	6.59	6.77	6.38	6.39	6.80	6.53	6.65	-	0.56	0.05	0.10
HCW, lb[4]	757	783	783	786	820	796	815	850	860	850	872	874	8	0.32	< 0.01	< 0.01
Dress, %[6]	62.2	62.2	62.6	62.7	62.8	62.9	63.9	63.8	64.1	64.0	64.1	64.1	0.4	0.62	0.98	0.29
LM area, in^2 [6]	11.5	12.4	12.1	11.4	12.2	11.6	13.4	12.5	12.4	12.3	12.6	12.8	0.6	0.76	0.81	0.17
12th rib backfat thickness, in[4]	0.70	0.68	0.70	0.69	0.69	0.70	0.75	0.77	0.81	0.78	0.87	0.82	0.02	0.26	0.25	< 0.01
Marbling score[4]	570	523	520	531	506	527	579	549	567	588	553	580	13	0.66	< 0.01	< 0.01
Calculated YG[4]	3.95	3.70	3.83	4.03	3.93	4.03	3.67	4.16	4.30	4.27	4.48	4.28	0.22	0.56	0.71	0.05

[1] NORMAL = 151 days on feed, PLUS14 = 165 days on feed, PLUS28 = 179 days on feed, PLUS42 = 193 days on feed; NON = no implant, 200 = Revalor 200 on d 1, re-implant with Revalor 200 on d 100, XH = Revalor XH implant on d 1.
[2] P-values for the implant x treatment interaction (Inter), implant (Trt) and days on feed (Serial).
[3] Final pen BW calculated with a 4% pencil shrink applied.
[4] Linear effect of days on feed (P < 0.05).
[5] Carcass adjusted final BW = HCW / (common dressing percent of 0.63).
[6] Linear effect of days on feed (P ≤ 0.10).
[7] Marbling: 500 = Small^{00}.
[8] Calculated yield grade: 2.50 + (2.5 x 12th Rib Fat, in.)–(0.32 x REA, in^2) + (0.0038 x HCW, lb).

among treatments. There were no significant ($P \leq 0.26$) implant x serial slaughter interactions for feedlot performance and carcass characteristics. Simple effect means are presented in Table 1 to allow calculation of the main effect of implant or days on feed. Dry-matter intake was not different among implant treatments ($P \geq 0.11$). Live final BW and ADG increased linearly ($P < 0.01$) as days on feed increased. Live final BW and live ADG were greater ($P = 0.03$ and $P = 0.05$, respectively) for cattle implanted with 200 and XH compared to NON. Feed efficiency calculated from live performance increased linearly ($P < 0.01$) with days on feed. Live F:G was improved ($P = 0.02$) when heifers were implanted with 200 or XH compared with NON. Carcass adjusted final BW increased linearly ($P < 0.01$) as days on feed increased. Heifers implanted with 200 or XH had heavier carcass adjusted final BW compared to NON ($P < 0.01$). There was a tendency ($P = 0.10$) for carcass adjusted ADG to decrease linearly from 4.03 to 3.90 lb/d as days on feed increased by 42 d from NORMAL to PLUS42. Heifers implanted with 200 and XH had greater ($P \leq 0.01$) carcass adjusted ADG compared to NON heifers (4.07 and 4.04 vs 3.79 lb/d, respectively). There was a tendency ($P = 0.10$) for days on feed to increase carcass adjusted F:G from 6.40 to 6.64 (NORMAL vs PLUS42, respectively). Heifers implanted with 200 and XH had improved ($P = 0.05$) carcass adjusted F:G compared with NON heifers (6.34 and 6.46 vs 6.75, respectively). As days on feed increased from NORMAL to PLUS42, HCW increased linearly ($P < 0.01$) from 775 to 865 lb. Heifer HCW was greater for 200 and XH compared to NON (831 and 828 vs 802 lb, respectively). Dressing percent tended ($P = 0.06$) to increase linearly from 62.3 to 64.0% as heifers were fed from NORMAL to PLUS42 days on feed. Longissimus area also tended ($P = 0.09$) to increase linearly as days on feed increased from NORMAL to PLUS42 (12.0 to 12.5 in^2, respectively). Fat depth, marbling score and calculated yield grade increased linearly ($P < 0.01$) as days on feed increased. Marbling score was greater ($P < 0.01$) for non-implanted heifers (NON) compared with heifers implanted with 200 and XH.

These data suggest feeding heifers to longer days on feed decreases ADG but also increases HCW and feed efficiency as fat deposition increases. Implanting heifers reduced marbling score but did not have an impact on fat depth. These results may be due to the fatness of the heifers. While increasing days on feed increases HCW and profit potential, there is also increased risk for YG discounts as heifers deposit fat. Implanting heifers with either 200 or XH increases animal performance and efficiency

while also increasing HCW and thus HCW revenue. Long-term implant strategies coupled with increased days on feed can substantially increase HCW and revenue assuming YG discounts can be overcome.

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