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Summary with Implications

A commercial feedlot study utilizing 1,737 crossbred heifers (initial BW 690 lb) compared the effect of two implant strategies [Synovex ONE Feedlot (day 0) or Synovex Choice (day 0) followed by Synovex Plus (day 95)] on performance and carcass characteristics. No differences were observed in carcass weight, final body weight, or gain, but heifers implanted with Synovex ONE Feedlot had slightly greater feed conversion and greater intake than heifers implanted using Synovex Choice/Synovex Plus. Heifers implanted with Synovex Choice/Synovex Plus had lower marbling score and yield grade, higher dressing percentage, and greater loin muscle area compared to heifers implanted with Synovex ONE Feedlot. Cattle implanted with Synovex ONE Feedlot showed a tendency for better quality grading compared to heifers implanted with Synovex Choice/Synovex Plus. These data suggest that implanting heifers with Synovex ONE Feedlot gives comparable growth to heifers implanted with Synovex Choice followed by Synovex Plus, with some changes in fatness when fed equal days.

Introduction

The use of growth-promoting implants in both steers and heifers improves growth performance and lean meat yield when compared to unimplanted cattle. There are many different implant strategies common in the industry. With increased incentive to feed cattle to heavier weights, a dual-implant strategy with an implant given upon arrival and a terminal implant given later is common. The level of trenbolone acetate (TBA) and estradiol (E) or the estradiol analog estradiol benzoate (EB) provided in those implants determine the strength of the implant, with the highest concentration of TBA or E typically found in the terminal implant. Re-implanting cattle requires handling animals a second time. A single implant able to cover the entire feeding period may be appealing to producers that want to minimize labor costs or reduce handling. Synovex ONE Feedlot is a single implant that is coated with a polymer film that delivers a slow release of TBA and EB. This allows the implant to remain active up to 200 days. The objective of this study was to evaluate the effects of implanting heifers with Synovex ONE Feedlot compared to a dual implant strategy of Synovex Choice followed by Synovex Plus on finishing heifer performance and carcass characteristics.

Procedure

Crossbred heifers (n = 1737) weighing 690 lb of initial body weight (BW) were fed at a commercial feedyard in central NE (Ford Farms, Cairo, NE). Heifers were sourced from sale barns located in NE, KS, and OK. The study was designed as a randomized complete block design with blocking factor being arrival date and initial weight of the cattle and pen was replication. Treatments were (1) implanting with Synovex ONE Feedlot (200 mg of TBA + 28 mg EB; **ONE**) at initial processing and (2) implanting with Synovex Choice (100 mg TBA + 14 mg EB) at initial processing followed by Synovex Plus 95 days later (200 mg TBA + 28 mg EB; **CH+**). Heifers were randomly allotted to pen (n = 24) based on a BW randomization using pay weight. There were 12 replications started on trial over 9 dates. Treatments were assigned to pens within replication using a random number generator. Heifers were processed, weighed, and assigned to pen and treatment in one event. At initial processing, heifers received Inforce 3 (Zoetis), One Shot BVD (Zoetis), albendazole (Valbazen, Zoetis), doramectin (Dectomax, Zoetis), and an implant based on the assigned treatment. Also at processing, heifers were pregnancy checked using rectal ultrasound and if bred, were administered dinoprost tromethamine (Lutalyse HighCon, Zoetis) or both Lutalyse HighCon and dexamethasone to abort. Heifers that were aborted were not removed from the study. Re-implanting occurred between 93 and 95 days after initial processing for heifers assigned to the CH+ strategy. Heifers assigned to the ONE strategy were not processed after initial processing. Heifers were fed an average of 182 days.

Three intermediate diets were used to step up heifers onto a finishing diet containing 59.46% corn (dry rolled, high moisture, or a blend), 30% wet or modified distillers grains plus solubles (DGS), 3% alfalfa hay, 5% corn stalks, 2.5% supplement meal, 0.04% micro-ingredients on a dry matter (DM basis). All ration formulation changes were the same relative to days on feed for all cattle throughout the trial. Initial BW was defines as individual BW at processing, shrunk 4.0%. Final BW was collected at time of shipping using weights collected on the truck, then taking average pen weight shrunk 4.0% to adjust for gut fill. Cattle were harvested at a commercial facility on four dates and individual carcass data were collected. Individual hot carcass weight (HCW) was collected at slaughter. Following a 24 hr chill, 12th-rib fat depth, longissimus muscle (LM) area, marbling scores, USDA quality grade (QG), and USDA yield grade (YG) were collected.

Statistical analysis of performance and carcass data were conducted using the Mixed procedure of SAS (9.3, SAS Institute Inc, Cary, NC). Pen was the experimental unit. Treatment and block were considered fixed effects. All performance and carcass data were analyzed with initial BW as a covariant because of a very small yet sig-

Table 1. The effect of using one slow-release implant compared to a dual implant strategy on heifers fed 182 d

	Treatment[1]			
Item	ONE	CH+	SEM	*P*-Value
No. of heifers (pens)	869 (12)	868 (12)	-	-
Initial BW, lb	690	691	0.5	0.08
DMI, lb/d	23.6	23.3	0.11	0.09
Initial 96 d, lb/d[3]	21.8	22.1	0.16	0.34
Final 85 d, lb/d[3]	25.7	24.8	0.17	<0.01
Live Performance				
Final BW, lb[2]	1367	1366	3.1	0.90
ADG, lb/d	3.74	3.74	0.016	0.97
F:G	6.33	6.25	0.030	0.10
Carcass-adjusted performance				
Final BW, lb[4]	1362	1371	3.6	0.13
ADG, lb	3.72	3.76	0.019	0.13
F:G	6.37	6.21	0.028	<0.01
Carcass characteristics				
HCW, lb	846.0	851.8	2.19	0.11
Dressing Percentage, %	61.9	62.3	0.001	0.02
Marbling score	534.7	508.4	4.45	<0.01
LM area, in[2]	13.2	13.6	0.07	<0.01
12[th]-rib fat thickness, in	0.772	0.750	0.01	0.15
Calculated Yield Grade	3.92	3.76	0.04	<0.01

[1]ONE = Synovex One Feedlot on d 0; CH+ = Synovex Choice on d 0 and Synovex Plus on d 95.

[2]Final BW is the average pen weight shrunk 4.0%. Subsequent ADG and G:F are calculated from shrunk final BW.

[3]These DMI figures are from before and after re-implanting dates for the CH+ treatment.

[4]Calculated as HCW divided by the mean dressing percentage of 62.13%. Subsequent ADG and G:F calculated using carcass-adjusted final BW.

Table 2. A comparison of the distribution of quality grade and calculated yield grade between heifers implanted with two different strategies

	Treatment[1]			
Item	ONE	CH+	SEM	*P*-Value
USDA Quality Grade, %			-	0.06
Prime	8.40	5.79	0.90	0.06
Upper 2/3 Choice	47.81	41.79	1.56	0.02
Low Choice	35.37	39.15	1.21	0.05
Select	8.42	13.27	0.71	<0.01
USDA Yield Grade, %			-	0.09
1	1.61	2.45	0.53	0.29
2	11.51	14.52	1.21	0.11
3	39.23	47.00	1.44	<0.01
4	38.48	29.11	2.38	<0.01
5	9.16	6.91	1.10	0.17

[1]ONE = Synovex One Feedlot on d 0; CH+ = Synovex Choice on d 0 and Synovex Plus on d 95.

nificant difference between treatments for initial BW. Quality grade and yield grade distributions and morbidity and mortality data were analyzed using the Glimmix procedure of SAS. Treatment differences were significant at an α value equal to or less than 0.05.

Results

Heifers implanted using the ONE strategy had a tendency for greater ($P = 0.09$) DMI than those implanted with the CH+ strategy (Table 1) with heifers implanted using the CH+ strategy having significantly ($P < 0.01$) lower DMI in the final 85 days following re-implanting. No differences were observed between treatments for carcass-adjusted final BW, live final BW, live ADG, and carcass-adjusted ADG ($P \geq 0.13$). Heifers implanted using the CH+ strategy had lower ($P < 0.01$) F:G on a carcass-adjusted basis compared to those implanted with the ONE strategy, but similar ($P = 0.10$) F:G on a live basis. All heifers had similar ($P = 0.11$) HCW. Cattle implanted using the ONE strategy had greater ($P \leq 0.01$) marbling score and calculated YG than those implanted using the CH+ strategy. Heifers implanted with the CH+ strategy had greater ($P \leq 0.02$) dressing percentage and LM area than heifers implanted with the ONE strategy. Treatments had similar ($P = 0.15$) 12[th] rib fat thickness.

A tendency ($P = 0.06$) for a difference in QG distribution between treatments was observed (Table 2). Heifers implanted using the ONE strategy showed a tendency ($P = 0.06$) for greater percent of carcasses grading Prime and a greater ($P = 0.02$) percent of carcasses grading in the upper 2/3 of Choice. Furthermore, heifers implanted with the ONE strategy had a lower ($P = 0.05$) percent of carcasses grading in the lower 1/3 of Choice and a lower ($P < 0.01$) percent carcasses grading Select compared to cattle implanted with the CH+ strategy. The USDA Yield Grade distributions tended ($P = 0.09$) to be different between the two implant strategy treatments. Treatments did not differ ($P \geq 0.11$) in percent YG1 or YG2 carcasses but those implanted with the CH+ strategy had numerically greater percent YG1 and YG2 carcasses. Heifers implanted using the CH+ strategy had greater ($P < 0.01$) percent YG3 carcasses while those implanted with the ONE

strategy had greater ($P < 0.01$) percent YG4 carcasses. Treatments were not different ($P = 0.17$) in percent YG5 carcasses but heifers implanted with the ONE strategy had numerically greater percent YG5 carcasses. No differences ($P \geq 0.38$) were observed between treatments for percent morbidity or mortality.

Conclusion

When fed to the same number of days, heifers implanted with the ONE strategy had greater intake but similar final weight and gain to heifers implanted with the CH+ strategy, resulting in slightly poorer feed conversion. Treatments had similar carcass weights and 12th rib fat thickness, but heifers implanted with the ONE strategy showed higher marbling scores and yield grade with lower dressing percentage and smaller loin muscle area. Heifers implanted with the ONE strategy showed an improvement in quality grade over heifers implanted with the CH+ strategy but had a higher percent yield grade 4 than cattle implanted with the CH+ strategy. No differences were observed between treatments in morbidity or mortality. These data suggest that utilizing Synovex ONE Feedlot in heifers can improve operational efficiency with minimal effect on performance.

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