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Abstract

Two hundred-sixteen Angus and Angus-cross steer calves (690 lb) were used in a 129- day finishing study to evaluate different implant strategies, including an experimental new implant for feedlot cattle that contains 28 mg of estradiol benzoate and 200 mg of trenbolone acetate (EBTBA). Treatments were 1) nonimplanted control, 2) implanted and reimplanted with Synovex-Sfi, 3) single initial implant with EBTBA, 4) single initial implant with Revalor-Sfi, 5) implanted with Synovex-S and reimplanted with EBTBA, and 6) implanted and reimplanted with EBTBA. Initial implants and reimplants were administered on day 0 and 63, respectively. All implant treatments increased feed intake, slaughter and carcass weights, and rate and efficiency of gain. Compared with other implant treatments, the use of EBTBA as a reimplant treatment (trts 5 and 6) resulted in improved (P<.08) rate and efficiency of gain and heavier carcass weights (P<.07). However, only 58.3% of cattle in trts 5 and 6 graded Choice vs. 86.1% for controls and 80.6% for steers implanted twice with Synovex-S (P<.07). Carcasses were more masculine (P<.07) for steers in trts 5 and 6 than for nonimplanted controls, steers implanted with Revalor-S, and steers implanted twice with Synovex-S. Performance of steers implanted once with EBTBA did not differ from that of steers implanted once with Revalor-S or twice with Synovex-S, but carcasses were more masculine (P<.07) for EBTBA vs. Revalor-S steers. Implant treatment did not affect meat tenderness, as measured by Warner-Bratzler shear force determinations. Single EBTBA or Revalor-S implants resulted in performance and carcass traits similar to those resulting from implanting twice with Synovex-S.

Keywords

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IMPLANT STRATEGIES FOR FINISHING CALVES

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Summary

Two hundred-sixteen Angus and Angus-cross steer calves (690 lb) were used in a 129-day finishing study to evaluate different implant strategies, including an experimental new implant for feedlot cattle that contains 28 mg of estradiol benzoate and 200 mg of trenbolone acetate (EBTBA). Treatments were 1) nonimplanted control, 2) implanted and reimplanted with Synovex-Sfi, 3) single initial implant with EBTBA, 4) single initial implant with Revalor-Sfi, 5) implanted with Synovex-S and reimplanted with EBTBA, and 6) implanted and reimplanted with EBTBA. Initial implants and reimplants were administered on day 0 and 63, respectively. All implant treatments increased feed intake, slaughter and carcass weights, and rate and efficiency of gain. Compared with other implant treatments, the use of EBTBA as a reimplant treatment (trts 5 and 6) resulted in improved (P<.08) rate and efficiency of gain and heavier carcass weights (P<.07). However, only 58.3% of cattle in trts 5 and 6 graded Choice vs. 86.1% for controls and 80.6% for steers implanted twice with Synovex-S (P<.07). Carcasses were more masculine (P<.07) for steers in trts 5 and 6 than for nonimplanted controls, steers implanted with Revalor-S, and steers implanted twice with Synovex-S. Performance of steers implanted once with EBTBA did not differ from that of steers implanted once with Revalor-S or twice with Synovex-S, but carcasses were more masculine (P<.07) for EBTBA vs. Revalor-S steers. Implant treatment did not affect meat tenderness, as measured by Warner-Bratzler shear force determinations. Single EBTBA or Revalor-S implants resulted in performance and carcass traits similar to those resulting from implanting twice with Synovex-S.

(Key Words: Implant, Estradiol, Trenbolone Acetate, Steers.)

Introduction

Anabolic implants are proven, safe, and effective management tools to enhance both feeder profitability and red meat production. In order to optimize performance and maximize net return, implant programs should be custom designed and based on cattle type, projected days on feed, and market or contract specifications for finished cattle.

Combinations of trenbolone acetate (TBA) and estradiol or other estrogenic compounds have been shown to improve rate and efficiency of gain compared to either type of compound administered separately. Currently, the only approved implant containing both TBA and estradiol for feedlot steers is Revalor-S (120 mg TBA plus 24 mg estradiol). A new experimental implant containing 200 mg of TBA and 28 mg of estradiol benzoate (EBTBA) may be available for use in feedlot steers, pending FDA approval. The objective of this study was to evaluate performance and carcass traits of finishing steer calves that received the new implant.

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Experimental Procedures

Two hundred-sixteen Angus and Angus-cross steer calves (690 lb) were utilized in a 129-day finishing study. Six treatments were evaluated in a randomized complete block design experiment: 1) control (nonimplanted), 2) Synovex-S on day 0 and again on day 63, 3) EBTBA on day 0, 4) Revalor-S administered on day 0, 5) Synovex-S administered on day 0 followed by EBTBA on day 63, and 6) EBTBA on day 0 followed by EBTBA on da y 63. Steers originated from two sources; one group was purchased at an auction in Montana, and the other consisted of calves from the KSU Animal Science commercial cow herd. Steers arrived at the feedlot, were commingled, and were fed a growing ration for approximately 55 days before the trial began. Init ial weights were early morning, full weights obtained on day -1 and day 0 of the study. The first-day weights also served as allotment weights. Steers were blocked by weight to one of six blocks and then assigned randomly to each of six treatments within each block. Steers were dewormed and vaccinated against IBR, BVD, PI3, and BRSV (modified live vaccine) and *Clostridium perfringens* types C and D. The study was conducted from January 14 to May 23, 1994.

Steers were brought to full feed in 11 days using three step-up rations based on dry rolled corn and containing 40, 25, and 15% sorghum silage (DM basis). The finishing ration contained 10% sorghum silage (DM basis), was formulated to contain 13.5% CP, and provided 275 mg of Rumensinfi and 90 mg of Tylanfi per head daily.

Final weights were the averages of two consecutive early-morning full weights. Steers were slaughtered at a commercial packing plant on the same day that the last weight was obtained. Carcass data were obtained by a team of trained meat scientists following a 24-hour chill. Steaks from the wholesale rib of each carcass were removed, vacuum packaged for aging periods of 14 or 28 days, and subjected to Warner-Bratzler shear force determination. Two steers were removed from treatment three (EBTBA) because of lameness.

Results and Discussion

Implanting steers improved (P<.0001) rate and efficiency of gain compared to nonimplanted control steers (Table 1). Steers implanted twice with EBTBA gained faster (P<.08) than those in any other implant treatment. Steers implanted with Synovex-S initially and reimplanted with EBTBA gained faster (P<.08) than steers implanted and reimplanted with Synovex-S or those implanted once only with either EBTBA or Revalor-S. Rates of gain were similar for steers implanted once with EBTBA or Revalor-S.

Dry matter intake (DMI) was greater (P<.002) for implanted vs. control steers when expressed as lb/day, but did not differ between treatments as a percentage of mean body weight (Table 1). Also, no differenc es occurred among implanted steers in DMI as either lb/day or percentage of body weight. Further, no treatment differences in DMI existed among treatment groups during the first 35 days of the study (data not shown), suggesting that implanting did not directly increase DMI.

Feed required per unit of gain was lower (P<.08) for steers reimplanted with EBTBA (trts 5 and 6) than for all other implant treatments (Table 1). Feed/gain did not differ between steers implanted once with EBTBA compared with those implanted once with Revalor-S (P=.33) or twice with Synovex-S (P=.46).

Implanting increased (P<.0001) hot carcass weights of steers (T able 2). Hot carcasses were heavier (P<.07) for steers reimplanted with EBTBA (trts 5 and 6) than for other implant treatments. Carcass weights did not differ between steers implanted once with EBTBA or Revalor-S or twice with Synovex-S. Dressing percentage did not differ among treatments. Ribeye areas were greater (P<.10) for steers reimplanted with EBTB A (trts 5 and 6) than for control, reimplanted Synovex-S, or Revalor-S steers, but were actually smaller (P<.10) than those of control steers when expressed as area per 100 lb of carcass weight.

Backfat thickness was greater (P<.07) for all implanted groups compared to nonimplanted controls. Neither percentage of kidney, pelvic, and heart fat (KPH) nor yield grade differed among treatments.

Lean maturity was unaffected by treatment (Table 2). Skeletal maturity was increased (P<.01) by all implant treatments when compared with nonimplanted controls. Skeletal maturity was higher (P<.07) for steers implanted twice with EBTBA than for steers implanted once with EBTBA (trt 5), once with Revalor-S, or twice with Synovex-S. Overall maturity, a combination of lean and skeletal maturity, closely paralleled skeletal maturity.

Marbling score was lower (P<. 07) for steers implanted and reimplanted with EBTBA (trt 6) than for any other treatment group (Table 2). Compared to steers implanted twice with Synovex, using EBTBA as a reimplant (trts 5 and 6) reduced (P<.07) Choice and prime carcasses from 80.6% to 58.3%. Single initial EBTBA and Revalor-S implants (trts 3 and 4) numerically (P>.60) reduced percentage Choice and Prime carcasses, compared to steers implanted twice with Synovex-S.

Masculinity score, a composite evaluation of the carcass crest and jump muscles, was lower (more masculine) for all EBTBA treatments (trts 3, 5, and 6) than for non-implanted controls, steers implanted twice with Synovex-S, or those implanted with Revalor-S (P<.07; Table 2). Steers implanted once with EBTBA had more (P<.07) masculine carcasses than steers implanted with Revalor-S. Masculinity scores of steers implanted with Revalor-S did not differ from those of steers implanted twice with Synovex-S. Warner Bratzler shear force for longissimus steaks was unaffected by treatment after either 14 or 28 days of aging (Table 2), in agreement with previous work evaluating the effects of steroidal implants on meat tenderness in steers.

Using EBTBA either as a terminal implant (trt 5) or twice in reimplant programs (trt 6) resulted in increased rate and efficiency of gain compared to a single initial EBTBA or Revalor-S implant or implanting and reimplanting with Synovex-S. However, those implant strategies resulted in a dramatic reduction in Choice-grading carcasses and also increased masculine appearance. Use of a single EBTBA implant in a 129-day feeding period did not improve performance and resulted in more masculine appearing carcasses compared to Revalor-S. Use of a single EBTBA or Revalor-S implant and implanting twice with Synovex-S resulted in similar performance and carcass traits.

Table 1. Effect of Implant Strategy on Performance of Finishing Calves (129 days)

	Treatment						
	1	2	3	4	5	6	
	None	Synovex	EBTBA	Revalor	Synovex	EBTBA	
Item	None	Synovex	None	None	EBTBA	EBTBA	SEM
No. Pens	6	6	6	6	6	6	
No. Steers	36	36	34	36	36	36	
Initial wt, lb	689	689	690	690	689	689	
Final wt, lb	1114[a]	1190[b]	1191[b]	1190[b]	1215[c]	1236[d]	7.8
Daily gain, lb	3.30[a]	3.88[b]	3.89[b]	3.88[b]	4.08[c]	4.24[d]	.061
DM intake,							
lb/day	20.6[a]	22.0[b]	21.7[b]	22.1[b]	22.1[b]	22.3[b]	.28
% of BW	2.29	2.35	2.31	2.36	2.32	2.32	.028
Feed/Gain	6.27[d]	5.68[c]	5.58[bc]	5.71[c]	5.42[ab]	5.27[a]	.095

[a,b,c,d]Means in a row not bearing a common letter differ (P<.08).

Table 2. Effect of Implant Strategy on Carcass Traits (Initial Implant, Day 0; Second Implant, Day 63)

	Treatment						
	1	2	3	4	5	6	
	None	Synovex	EBTBA	Revalor	Synovex	EBTBA	
Item	None	Synovex	None	None	EBTBA	EBTBA	SEM
Hot weight, lb	674[c]	727[de]	725[d]	723[d]	742[ef]	753[f]	5.9
Dressing %	60.5	61.1	61.1	60.7	61.0	60.9	.27
Ribeye area,							
in^2	12.20[g]	12.20[g]	12.79[hi]	12.49[gh]	12.97[i]	12.97[i]	.191
in^2/cwt HCW	1.82[e]	1.68[c]	1.77[de]	1.73[cd]	1.75[d]	1.72[cd]	.025
Backfat, in	.48	.54	.57	.52	.53	.54	.035
KPH, %	2.11	2.09	2.11	2.10	2.07	2.07	.074
Yield grade	2.78	3.13	3.02	2.96	2.91	2.99	.125
Maturity							
Lean	A[56]	A[56]	A[52]	A[54]	A[56]	A[56]	1.7
Skeletal	A[25c]	A[50d]	A[51de]	A[47d]	A[50d]	A[57e]	2.5
Overall	A[40c]	A[53de]	A[52d]	A[51d]	A[53de]	A[57e]	1.7
Marbling[a]	5.60[d]	5.46[d]	5.48[d]	5.25[cd]	5.24[cd]	5.06[c]	.150
Pct Choice	86.1[c]	80.6[c]	73.5[cd]	75.0[cd]	58.3[d]	58.3[d]	8.1
Abscessed							
livers, % 8.3	5.7	11.1	13.9	5.6	8.3		
Masculinity score[b]	4.33[e]	4.31[de]	4.11[cd]	4.36[e]	4.08[c]	3.92[c]	.085
Dark cutters, n	0	2	0	0	0	0	
Shear force, lb[j]							
14 days	8.81	8.75	8.60	8.38	8.59	8.93	.38[k]
28 days	8.14	8.38	8.40	8.31	7.97	8.13	

[a]Small[0] = 5.0, small [50] = 5.5, etc.

[b]Scored on scale of 1 to 5; 1 = very masculine, 5 = not masculine.

[cdef]Means in a row not bearing a common letter differ (P<.07).

[ghi]Means in a row not bearing a common letter differ (P<.10).

[j]Effect of aging (P<.05).

[k]SEM for shear force pooled across days of aging.