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EFFECTS OF ESTRADIOL-TRENBALONE ACETATE IMPLANT COMBINATIONS ON FEEDLOT PERFORMANCE AND CARCASS TRAITS OF TWO STEER TYPES

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Summary

Hereford x Angus (HA) and predominantly Gelbvieh cross (Gx) steer calves either received no implant (control) or were implanted initially and again at 77 days on feed with a combination of estradiol and trenbalone acetate based implants. Calves were started on feed in December weighing 677 lb and fed for 146 to 167 days. Fed for a common period of time, implanting steers increased ($P<.05$) ADG, dry matter intake, final weight, carcass weight, rib fat thickness and yield grade. Implanting reduced ($P<.01$) marbling scores. Gx steers were heavier and grew more rapidly than HA steers. There were no interactions between breed type and implant treatments for any variables measured. The action of implants to depress marbling scores is not overcome by increasing steer weight and condition to levels similar to nonimplanted controls.

(Key Words: Steer, Estradiol, Trenbalone Acetate, Feedlot, Carcass.)

Introduction

Cattle feeders recently began using a combination of estradiol (Synovex-S[4]) plus trenbalone acetate (Finaplix-S[5]) based implants to improve performance of finishing cattle. The combination can be expected to improve rate of gain, reduce fatness at a common weight and improve feed efficiency. There is evidence that this implant combination may cause lower marbling scores in carcasses of implanted steers. Current speculation is that, if implanted steers were taken to heavier weights and concomitantly to greater fatness, the depression in marbling scores would be overcome.

Since these implants increase rate of gain, implanted steers fed for similar periods of time as nonimplanted steers should be heavier. The additional weight gained may be adequate to produce desirable carcasses. The increase in market weight would be appropriate for small framed cattle but may be detrimental for large framed steers where heavy carcasses could result in discounts. This experiment was conducted to determine the effects of cattle type and estradiol plus trenbalone acetate (TBA) implant combinations on feedlot performance and carcass traits of steer calves.

Materials and Methods

Hereford-Angus (HA) and predominantly Gelbvieh cross (Gx) steer calves were purchased at weaning. Steers were shipped to the Brookings research feedlot, processed and fed a corn silage based receiving diet. The receiving period was continued for 60 days to allow cattle to overcome shipping stress and to normalize body condition across breed types. Thirty-eight steers were selected from each breed group and allotted to control or implant treatments. Control steers received no implant. The implant group received estradiol and TBA based implants initially and were reimplanted after 77 days. Initial weights were taken after a 12-hour fast on two consecutive days. A single final weight was obtained following a 12-hour fast. There were 19 steers in each breed type x implant group. During the initial 56 days on feed, steers were penned in these 19-head groups. After 56 days, steers were sorted into 9- and 10-head pens. The finishing diet (Table 1) was fed beginning on the day the first implants were administered.

Pens were closed out when steers reached an acceptable market weight and condition. One pen each of control and implanted HA were slaughtered after 146 days on feed. The remaining HA were slaughtered after 153 days. All Gx steers were slaughtered after 167 days on feed.

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TABLE 1. FINISHING DIET FORMULATION AND COMPOSITION[ab]

Item	Amount
Corn silage, %	10.00
High moisture ear corn, %	30.00
Whole shelled corn, %	52.77
SBM, %	5.54
Trace mineralized salt, %	.25
Limestone, %	1.03
Dicalcium phosphate, %	.16
Potassium chloride, %	.25
Crude protein, %	11.2
NEm, Mcal/cwt	91.4
NEg, Mcal/cwt	60.2

[a] Dry matter basis.
[b] Diet provided 25 grams/T Rumensin and 1,000 IU per lb vitamin A.

There was no pen replication during the initial 56 days on feed. Therefore, intake and feed conversions during this period were not suited to statistical analysis. Data collected after 56 days were analyzed as appropriate for a 2 x 2 factorial arrangement of treatments. These data were evaluated on a pen mean basis. Cumulative ADG and carcass data were tested using individual steer data in the analysis of variance.

Results and Discussion

Cumulative ADG was greater for implanted ($P<.001$) and for Gx ($P<.05$) steers. After the initial 56 days on feed, there was no breed type effect ($P>.10$) on ADG. The gain response to implants ($P<.01$) persisted throughout the study. As a result of gain responses, Gx and implanted steers were heavier ($P<.05$) than HA and nonimplanted steers at each weigh date (Table 2).

Implants caused increased feed intakes ($P<.05$) and Gx steers tended ($P<.10$) to consume more feed than HA. There was a trend ($P<.15$) toward improved feed conversion by implanted steers that probably would be realized if there was greater pen replication. Days on feed were similar for implant groups within breed type. Implanting increased ($P<.01$) final weight of HA steers by 116 lb and Gx steers by 90 lb.

Carcass weights were heavier ($P<.001$) for Gx and implanted steers. Overall dressing percentage (59.0 $\pm$ .38%) was low probably due to fill when final weights were taken.

The HA steers were taken to a typical feedlot endpoint with an overall yield grade of 3.3. It was not practical to feed the Gx steers to this fatness because carcass weight would have been excessively heavy. Larger framed cattle provide the opportunity to market steers producing trimmer carcasses of an adequate weight. It was decided that the Gx steers should be marketed with .4 inch rib fat which is predominantly yield grade 2.

Implants tended ($P<.10$) to increase rib eye area and increased ($P<.05$) rib fat thickness (Table 3). Consequently, the yield grade was higher for carcasses from implanted steers. Most information to date based on feeding to a constant final weight indicates that this implant program will increase rib eye area but reduce rib fat and yield grade.

Quality grades were higher for HA steers as would be expected because of the additional carcass fatness. Quality grades were lowered ($P<.001$) by implanting, even though implant group carcasses were heavier and fatter. Control carcasses graded 66% Choice, while implant group carcasses graded 50% Choice.

Reduced percentage Choice carcasses have been previously noted with estradiol plus TBA implant programs. This is most prevalent when reimplanting as was performed in this study. It has been proposed that, if implanted steers were fed to a similar fat endpoint, the depression in intramuscular fat deposits would diminish. The results of this study suggest that these implants affected intramuscular fat to a greater

TABLE 2. FEEDLOT PERFORMANCE BY BREED TYPE AND IMPLANT TREATMENT

Item	Hereford-Angus	Gelbvieh cross	Control	Implant	SEM
Cumulative					
Initial wt[a]	655	698	676	677	6.6
Final wt[ab]	1096	1209	1101	1204	11.7
ADG	2.95	3.06	2.68	3.33	
DMI	16.83	17.77	16.33	18.27	
F/G	5.71	5.81	6.09	5.49	
After 56 days					
56-day wt[ab]	828	885	833	881	6.7
ADG[b]	2.86	2.91	2.62	3.16	.07
DMI[b]	17.82	18.86	17.27	19.41	.52
F/G	6.26	6.50	6.61	6.15	.27

[a] Breed type effect (P<.01).
[b] Implant effect (P<.01).

TABLE 3. CARCASS TRAITS BY BREED TYPE AND IMPLANT TREATMENT

Item	Hereford-Angus	Gelbvieh cross	Control	Implant	SEM
Carcass wt, lb[ab]	645	715	650	710	10
Dressing percent	58.9	59.1	59.0	58.9	.38
Rib fat, in.[bc]	.60	.40	.47	.53	.03
Rib eye area, in.^{2}[bd]	10.85	12.58	11.54	11.89	.21
KPH, %	1.70	1.60	1.72	1.58	.11
Yield grade[bc]	3.33	2.50	2.79	3.04	.11
Quality grade[abe]	17.18	16.26	17.02	16.42	.17

[a] Implant effect (P<.06).
[b] Breed type effect (P<.01).
[c] Implant effect (P<.05).
[d] Implant effect (P<.10).
[e] 18 = Ch^{0}, 17 = Ch^{-}.

extent than subcutaneous fat deposition. When carcass data were adjusted to a constant rib fat thickness by covariate analysis, differences in carcass weight and quality grade due to implant persisted (Table 4).

These data indicate that using estradiol plus TBA based implants in a reimplant program dramatically improved feedlot performance and increased carcass weights of steers when days on feed are constant. The percentage Choice carcasses is reduced by implanting even when cattle are fed until they have .6 inch rib fat. Increases in carcass weight due to implanting would be beneficial in small framed cattle but may be detrimental in larger framed steers. In this study, the reduction in carcass value (low marbling score; Select Choice spread $9.00/cwt) due to implants reduced the overall economic advantage of implanting from $25.32 per head to $13.63 per head over control steers.

TABLE 4. LEAST SQUARES MEANS FOR CARCASS TRAITS ADJUSTED TO A CONSTANT RIB FAT THICKNESS

Item	Hereford-Angus	Gelbvieh cross	Control	Implant	SEM
Carcass wt[ab]	642	717	651	708	10
Rib eye area, in.[2b]	10.89	12.54	11.53	11.90	.21
KPH	1.69	1.61	1.72	1.58	.12
Yield grade[b]	3.04	2.78	2.88	2.95	.06
Quality grade[ab]	17.15	16.30	17.04	16.41	.18

[a] Implant effect (P<.01).
[b] Breed type effect (P<.01).