Feedlot Performance and Carcass Traits of Texas Rambouillet Feeder Lambs Implanted With Growth Implants

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ABSTRACT

Three hundred cross-bred lambs with an average initial weight of 33.5 kg were used to compare the effects of three different hormone implants versus a control on lamb performance (ADG) and carcass characteristics. Lambs were divided into four groups and assigned implant treatments as follows: no implant (CON), Synovex[1] (SYN), Ralgro[2] (RAL), or Component C[3] (COM). On d 0, lambs were weighed, ear tagged and implanted according to treatment. Lambs were fed by a self-feeder. Weights were recorded on subsequent d 28, 56, 84, 97, and 108 and as end-weights were reached, lambs were slaughtered. Backfat thickness, cross-sectional ribeye area, USDA yield and quality grade measurements were recorded. Analysis showed significantly higher ADG *($P < 0.05$)* in COM and SYN lambs compared to CON d 28 through d 108. On d 56, RAL lambs also exhibited higher *($P < 0.05$)* ADG than CON lambs. Carcass evaluations yielded no conclusive evidence of improved quality of implanted vs. CON carcasses. A majority (95%) of carcasses received "choice" quality grades and yield grades of 3 to 5 thereby implying improved ADG with hormone implant use, with no simultaneous improvements in carcass quality.

Keywords: Sheep, Feedlot, Implants, Carcass

INTRODUCTION

With the loss of the wool support payments in 1995, there have been major strides made and increasing interest in the raising of lambs for profit in Texas. The early weaning of lambs and feeding of high-concentrate diets have led to favorable high market weights of these lambs (Shelton et al. 1969). Unfortunately, however, Texas lamb carcass quality has diminished and is in need of improvement (personal communication, Ken Emerick). On the USDA yield grade scale of 1 to 5, a majority of the Texas Rambouillet slaughter lambs have received a yield grade 3 or higher. Texas lambs continue to fall short of the industry's preferred leaner standard of yield grades 1 or 2. Methods of increasing the lean to fat ratio in these Texas Rambouillet slaughter lambs would prove to be an extremely profitable finding to the producer. Hormonal implants in the beef industry have been efficiently used for increasing lean deposition (Lemieux et al. 1990). Anabolic implants are widely used in the beef industry, but only 1.7% of sheep operations utilize growth promoting implants (USDA, 1996).

A wide variety of hormonal implants have been studied and used as an effective means of accomplishing such a desired shift or partitioning of nutrients away from the energy-expensive deposition of fat and towards the deposition of lean tissue. This metabolic shift consequently causes an increase in the animals' average daily gains due to a higher proportion of heavier lean tissue to lighter fat tissue, and this increase is accompanied by an associated increased feed efficiency, (Lemieux, et al. 1990).

Some side-effects associated with the use of such hormonal implants have been found. An increase in the frequency of rectal prolapses and decrease in the desired marbling trait of the carcasses have been observed. Problems with ear abscesses, or infection at the implantation site have also been noted Hufstedler, et al. (1996).

The purpose of this study was to determine the effect of implanting Texas Rambouillet feeder lambs with three different hormonal implants, in an effort to determine their effects on feedlot performance and carcass characteristics.

METHODS AND MATERIALS

This study was conducted at Denis Ranch feedlot located 25 miles east of San Angelo, TX. Three hundred Texas Rambouillet feeder lambs were randomly assigned to one of four groups to determine the effects of three different hormonal implant treatments, as compared to the control treatment, in affecting animal performance and carcass characteristics. The four implant treatments were: no implant (CON), Synovex[1] (SYN), Ralgro[2] (RAL) and Component C[3] (COM).

All lambs were fed a series of five rations (Table 1) *ad libitum*, for approximately 3 to 4 days each with increases in energy density, to a final finishing ration for the remainder of the trial. The beginning weight of the lambs was 35.5 kg. equalized across treatments. All lambs were fed in the same pen of 3.048 m by 9.14 m. Feed was dispensed by a self-feeder, and feed formulation met or exceeded NRC (1985) nutrient

[1]Synovex C- A product of Syntex, Inc., Palo Alto, CA. Dosage rate: estradiol benzoate, 10 mg and progesterone 100 mg per implant. One implant under skin of left ear. [2]Ralgro-Zeranol – A product of Schering-Plough Animal Health Corporation, Union, NJ. Dosage rate: Zeranol, 12 mg. One implant under skin of left ear.

[3]Componenet E-C – A product of Ivy Laboratories, Overland Park, KS. Dosage rate: One implant containing Estradiol benzoate, 10 mg and Progesterone, 100 mg. One implant under skin of left ear.

requirements for growing and finishing lambs. All lambs had access to clean, fresh water.

Throughout the course of the study, a total of 6 lambs experienced illness or death, and data pertaining to these lambs was excluded from statistical analysis.

Table 1. Dietary composition and nutritive values of diets fed to lambs (as fed basis).

Ingredient, %	Ration #1	Ration #2	Ration #3	Ration #4	Ration #5
Milo	30.0	36.0	48.7	63.2	73.7
Alfalfa	30.0	30.0	30.5	21.0	12.5
Cottonseed hulls	26.0	25.0	15.0	10.0	8.0
Urea	4.0	4.0	4.5	4.5	4.5
Cottonseed meal	7.5	2.5	0.0	0.0	0.0
Molasses	2.5	2.5	1.3	1.3	1.3
Aureomycin	0.05	0.05	0.05	0.05	0.05
Bovatec	0.02	0.02	0.02	0.02	0.02
Nutritional Value					
TDN, %	58.83	59.79	64.46	67.83	70.87
DE, Mcal/KG	2.69	2.73	2.84	2.99	3.12
Crude Protein, %	13.31	11.82	11.95	11.83	11.57

Animals were slaughtered as they reached approximately 56.7 kg as an end-weight. Lamb weights were recorded on d 0, 28, 56, 84, 97, and 108. Any lamb which had reached approximate market end-weight (56.7 kg) was slaughtered according to humane slaughter practices (Consortium, 1988) the following morning. No animals had reached slaughter end-weight by day 28 of the study, but animals were slaughtered on the day following all subsequent weigh dates. All lambs were slaughtered by d 108.

Post-slaughter, lamb carcasses were hung in a 34 degree cooler over-night and evaluated for carcass characteristics approximately 12 to 14 hours postmortem. Rib-eye areas and fat thickness were recorded on each carcass between the 12th and 13th rib. Yield grades were calculated by the equation: Yield Grade = 0.4 + (10 X Adjusted fat thickness, inches; USDA, 1992).

For both the performance test and carcass characteristic evaluations, the animal data were analyzed using repeated measures analysis of variance with day as the repeat measure; lambs (replications) were nested within treatments (Hicks, 1993). Differences among means were assessed by least significant difference when $P < .05$ (Gomez and Gomez, 1984). Data were analyzed with the statistical package JMP (SAS, 1994).

RESULTS AND DISCUSSION

A total of 294 lambs of the original 300 successfully completed the study and were included in the data analysis. The summer temperatures, including the 108 d of this study, were unusually hot. Calhoun et al. (1972) found decreased responses with hormone implant use in lambs in the heat of a Texas summer. They stated that lambs implanted with diethylstilbestrol and RAL gained 44.4 and 33.6 percent less, respectively, in the summer as compared to the winter months. Therefore, the unusually hot weather in west Texas may have been detrimental to the implants' potential effectiveness and in our obtaining more significant measures of difference between the implanted and CON.

Two problems encountered in previous implant studies have been increased incidence of rectal prolapses and abscesses at the ear implantation site. A total of 5 prolapses were observed in this study. COM, SYN, RAL, and CON treatment groups had 0, 2, 2, and 1 lamb(s), respectively, experienced rectal prolapse problems. Throughout the 108 d study, no ear abscesses were observed.

Performance data

In Table 2, average daily gains were significantly higher in the SYN implanted group, as compared to the CON group (P < .05), throughout the trial. Average daily gains were higher in the COM implanted group, as compared to the CON group (P < .05) on d 28, 56, and 84. There were no differences between the RAL and CON groups throughout the trial.

On d 28, the average daily gains of lambs implanted with SYN and COM were not different from each other, gaining .51 and .53 lb/d respectively, but greater (P <.05) than the ADG of RAL (.40 lb/d) and CON (.35 lb/d) lambs. At d 56, COM and SYN implanted lambs were higher (P < .05) in ADG than CON. Results of d 84 were similar to those at d 28, with SYN and COM implanted lambs not different from each other, but greater (P < .05) than the ADG of RAL and CON lambs. Average daily gain on d 97 showed SYN lambs to be greater (P < .05) than both CON and RAL with no difference between SYN and COM implants' effectiveness. Day 108 ADG showed SYN lambs to be greater (P < 0.05) than both CON and RAL lambs with no difference between SYN and COM implants' performance.

Table 2. The effect of hormone implant treatments on Texas Rambouillet feeder lambs average daily gain fed high concentrate diets

	Day				
Treatment	28	56	84	97	108
COM	$.53^{a}$ ±.02	$.92^{a}$ ±.08	$.59^{a}$ ±.02	$.55^{a,b}$±.02	$.48^{a,b}$ ±.02
SYN	$.51^{a}$ ±.02	$.92^{a}$ ±.08	$.62^{a}$ ±.02	$.60^{a}$ ±.02	$.55^{a}$ ±.02
RAL	$.40^{b}$ ±.02	$.75^{a,b}$ ±.08	$.53^{b}$ ±.02	$.48^{b}$ ±.02	$.44^{b}$ ±.02
CON	$.35^{b}$ ±.04	$.57^{b}$ ±.06	$.48^{b}$±.02	$.48^{b}$ ±.02	$.42^{b}$ ±.02

^{a,b}Means with different superscripts in the same column differ (P < 0.05).

These data agree with Nold et al. (1992) that RAL had no significant effect on average daily gain. However, Hutcheson et al. (1992), found that RAL did increase ADG over non-implanted lambs.

Overall, there were no observed differences in carcass quality between implanted (COM, SYN, and RAL) and CON lambs as compared using ribeye area, subcutaneous backfat thickness, calculated and observed USDA yield grades and quality grades as indices of overall quality measures (Table 3). There were no differences among any of the implanted groups or CON, relative to calculated or observed (USDA) yield grade. Over 95% of the carcasses, across all treatment groups, received a quality grade of "choice", with the remainder grading "prime". No significant differences were observed in backfat thickness or ribeye area measurements among treatment groups.

Table 3. The effect of hormone implants on Rambouillet lamb carcass characteristics.

Item	Treatment			
USDA Grader YG, %	COM	SYN	RAL	CON
1	2.6	0.0	0.0	0.0
2	36.1	19.7	25.0	26.7
3	48.0	69.8	62.5	62.0
4	0.0	2.0	2.8	2.8
Calculated YG, %				
1.0 – 1.5	12.0	10.8	5.5	13.5
1.6 – 2.5	26.7	27.0	28.8	20.2
2.6 – 3.5	37.3	37.9	32.9	36.5
3.6 – 4.5	13.3	13.5	17.8	20.3
$\geq$ 4.6	10.7	10.8	15.0	9.5
Quality grade, %				
Choice	98.6	95.8	96.8	98.6
Prime	1.3	1.4	4.1	0.0
Backfat thickness, mm	7.2	7.3	7.9	7.5
Ribeye area, cm^2	14.5	15.6	15.3	15.3

Therefore, these results indicate that hormonal implants, while having an effect on feedlot performance of Texas Rambouillet feeder lambs, did not have a subsequent effect on carcass characteristics of these same lambs at slaughter. The data agree with Nold et al. (1992) that implanted lambs with RAL did not affect carcass characteristics. However, Hutcheson et al. (1992) did find that RAL implanted lambs had a lower yield grade and lower kidney, pelvic and heart fat.

CONCLUSIONS

These data indicate that implanting with RAL which contains the active ingredient Zeranol did not increase ADG for the whole trial; however, SYN and COM which contain estradiol benzoate and progesterone were successful in increasing feedlot performance of Texas Rambouillet feeder lambs. However, both of these compounds are not approved for lambs to date. In addition, the desired affect of decreasing the yield grade of Texas Rambouillet slaughter lambs was also not obtained by using these implants. Therefore, more research in a more aggressive implant program is warranted incorporating re-implanting during the feedlot phase and perhaps using new compounds as well.

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