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Summary

Ninety crossbred yearling steers (818 ± 19 lb) were utilized to evaluate the influence of implant treatment and days on feed on carcass characteristics and feedlot average daily gain (ADG). Treatments included no implant (C), implanted with Synovex-S on day 1 and Synovex-S on day 60 (SS) and implanted with Synovex-S on day 1 and with Synovex-S and Finaplix-S on day 60 (SSF). Ten steers from each treatment were slaughtered after 120, 134 or 148 days on feed. Implanting increased (P<.0001) ADG 18.9% and hot carcass weight (HCW) 6.4%. However, interactions between treatment and days on feed were significant (P<.05) for ADG and HCW. No other interactions were apparent. Rib eye area (REA) was 4.7% greater (P<.05) for implanted steers as compared to nonimplanted controls (13.72 vs 13.11 $in.^2$). ADG (P<.12), HCW (P<.10) and REA (P<.05) were greater for steers implanted with SSF as compared to steers implanted with SS (3.90 vs 3.75 lb, 846 vs 831 lb, and 14.06 vs 13.38 $in.^2$, respectively). Marbling score (5.00 = Small^0) tended (P<.16) to be lower for implanted steers compared with nonimplanted controls (5.54 vs 5.77 units). Marbling score was slightly (P<.16) lower for cattle implanted with SSF as compared to cattle implanted with SS (5.40 vs 5.67). Predicted days required to reach 75% low choice were 113, 124 and 138 for C, SS and SSF, respectively.

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

Introduction

Finaplix-S was approved for use in feedlot steers in 1987. When used as the sole implant, performance appears to be increased slightly as compared to nonimplanted controls. Using Finaplix in combination with an estrogenic implant has resulted in tremendous improvements in performance of feedlot cattle and has become a common practice in the commercial cattle feeding industry.

Several reports have indicated that the percentage of cattle grading choice is reduced when the combination of Finaplix and an estrogenic implant is used. Depending upon when and how the cattle are sold, reduced propensity to grade choice would have serious economic consequences for cattle feeders. It has been proposed that the reduction in choice cattle can be overcome by feeding implanted cattle for additional days. However, it is not known how many additional days would be required.

The objective of this trial was to determine how many days cattle implanted with the combination of Finaplix-S and Synovex-S would need to be fed in order to achieve similar quality grades as nonimplanted cattle or cattle implanted only with Synovex-S.

Materials and Methods

Ninety crossbred yearling steers that had been grazing summer pastures at the Range and Livestock Research Station located near Philip, SD, were stratified by their July weight and allotted to three 30-head treatment groups. In mid-August, the cattle were weighed following an overnight (16 hours) withdrawal of feed and water. Sixty steers were implanted with Synovex-S. The remaining 30 steers were not implanted and served as a negative control.

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[1]Product of Syntex Animal Health, Des Moines, IA.
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Steers were transported to a commercial feedyard[4] located near Kimball, South Dakota, and fed in a common pen. Diets fed to the steers are shown in Table 1. Steers were adjusted to the finishing diet by feeding diet 1 for 10 days and diet 2 for 7 days. On day 60, 30 of the implanted steers were reimplanted with Synovex-S. The 30 remaining implanted steers were reimplanted with Synovex-S in the left ear and received a Finaplix-S implant in the right ear.

Ten randomly selected steers from each treatment were slaughtered after 120, 134 and 148 days on feed. The last weight of the steers obtained at the Range and Livestock Research Station the morning of shipment to the feedyard served as the trial initial weight. Final weight used to compute performance data was calculated by dividing hot carcass weight by the dressing percentage for each slaughter date. Carcass data were collected 24 hours postslaughter. The USDA grader called marbling scores and estimated the percentage kidney, heart and pelvic fat. Rib fat was measured with a steel probe and rib eye area was estimated with a grid. Carcass regrades were not considered in the analysis.

Data were analyzed according to analysis of variance procedures for a completely randomized design. Differences in percentage choice carcasses were tested by Chi-square analysis procedures. Means were separated using orthogonal contrasts. Comparisons of interest were no implant vs implant and Synovex-S day 60 vs the combination of Synovex-S and Finaplix-S day 60.

TABLE 1. COMPOSITION OF DIETS FED TO STEERS

	Diet		
Ingredient[a]	1	2	Finish
Cracked corn	29.07	48.22	51.70
High moisture corn			15.32
Corn silage	62.02	48.22	28.72
Alfalfa hay	5.81		
Mineral supplement	.19	.19	.19
Supplement[b]	2.91	3.37	4.07
Nutrient composition[c]			
Dry matter, %	51.67	59.04	66.51
Crude protein, %	12.36	12.00	12.36
Calcium, %	.72	.55	.53
Phosphorus, %	.35	.36	.37
NE_m, Mcal/cwt	81.20	89.68	93.74
NE_g, Mcal/cwt	51.25	58.76	62.10

[a] Percentage as fed.
[b] Sup-R-Lix, Purina Mills, Inc., St. Louis, MO.
[c] Dry matter basis.

[4] R and L Feedyard, Kimball, SD.

Results and Discussion

Table 2 shows average daily gain and the initial and final weights for steers. Average daily gain decreased with additional days on feed. Implanting improved (P<.0001) average daily gain (3.75 and 3.91 vs 3.22 lb per head daily for SS and SSF vs C, respectively). Steers implanted with SSF tended (P<.0813) to gain weight more rapidly than steers implanted with SS. However, the interaction between implant treatment and days on feed was significant for final weight (P<.0164) and average daily gain (P<.0105). Therefore, conclusions concerning the effect of dual implant use on average daily gain can not be drawn from these data.

TABLE 2. WEIGHT AND AVERAGE DAILY GAIN OF STEERS[a]

	Days on feed									
	120			134			148			
Item	C	SS	SSF	C	SS	SSF	C	SS	SSF	SEM
Initial wt, lb	821	821	817	813	825	819	801	819	819	18.33
Final wt, lb[bc]	1204	1309	1327	1254	1312	1294	1285	1329	1397	15.87
ADG, lb[bd]	3.23	4.09	4.25	3.26	3.69	3.56	3.16	3.46	3.92	.12

[a] C = control, SS = Synovex day 1 and Synovex day 60, SSF = Synovex day 1 and Synovex plus Finaplix day 60.
[b] Days x implant treatment interaction is significant (P<.02).
[c] C vs SS and SSF (P<.0001), SS vs SSF (P<.0813), days linear (P<.0002), days quadratic (P<.0580).
[d] C vs SS and SSF (P<.0001), SS vs SSF (P<.1101), days linear (P<.008), days quadratic (P<.0389).

Table 3 displays carcass data for steers. The interaction between implant and days fed for hot carcass weight (HCW) was significant (P<.0169). No other interactions were apparent. Implanting increased (P<.0001) HCW 6.4% (840 vs 789 lb). HCW increased 1.61 lb per head daily from 120 to 148 days on feed (P<.0001). No differences between treatments were noted for fat thickness at the 12th rib. Fat thickness increased about .0057 in. per day after day 120 on feed (P<.0003). Implanting increased (P<.0359) rib eye area (REA) 4.7% (13.72 vs 13.11 $in.^2$). REA was also larger (P<.0440) for SSF compared SS carcasses. REA increased (P<.0013) .0393 $in.^2$ per day after 120 days on feed. Kidney, heart and pelvic (KPH) fat tended (P<.0676) to be reduced for implanted cattle and increased .009642% per day after 120 days on feed (P<.0228).

Yield grade was similar across implant treatments and yield grade tended (P<.1454) to increase by .01 unit per day as days fed increased. Based on changes in HCW, rib fat thickness, REA and KPH, yield grade should have increased .0097 units per day. This appears consistent with the value observed.

Marbling score (5.0 = Small[0]) tended (P=.1571) to be reduced slightly for implanted cattle versus nonimplanted cattle. Cattle implanted with the combination of Finaplix-S and Synovex-S tended to have lower (P=.1510) marbling scores than cattle implanted with only Synovex-S. Marbling score was increased by .0179 units daily after 120 days on feed (P<.0092).

A major objective of this research was to determine the number of days on feed required to achieve similar quality grades. A common target end point for cattle in the industry is 75% choice. Or, in other words, 75% of the cattle need a marbling score of 5.0 or better. The area under a standard normal curve to the right of the mean minus .6745 (Z) times the standard deviation corresponds to 75% of the observations in the sample (Snedecor and Cochran, 1979). The standard deviation for marbling score in this trial was .72607. Therefore, a mean marbling score of 5.4897 units (5.0 + [.6745 x .72607]) would correspond to 75% of the cattle grading choice or better (Figure 1).

TABLE 3. CARCASS DATA FOR STEERS

Item	Treatment			Days			SEM
	C	SS	SSF	120	134	148	
Hot carcass weight, lb[a]	789	832	847	803	817	848	5.76
Fat thickness, in.[b]	.53	.54	.52	.49	.45	.65	.03
Rib eye area, in.^{2}[c]	13.11	13.38	14.06	12.78	13.89	13.88	.23
Kidney, heart and pelvic fat, %[d]	2.53	2.37	2.33	2.20	2.57	2.47	.08
Yield grade, units[e]	3.13	3.21	3.00	3.13	2.80	3.41	.13
Marbling score, units[f]	5.77	5.67	5.40	5.36	5.63	5.86	.13

[a] Treatment x day interaction (P<.0169), C vs SS and SSF (P<.0001), SS vs SSF (P<.0805), days linear (P<.0001), days quadratic (P<.2050).

[b] Days linear (P<.0003), days quadratic (P<.0013).

[c] C vs SS and SSF (P<.0359), SS vs SSF (P<.0440), days linear (P<.0013), days quadratic (P<.0510).

[d] C vs SS and SSF (P<.0676), days linear (P<.0228), day quadratic (P<.0227).

[e] Days quadratic (P<.004).

[f] 4.00 = Slight^0, 5.00 = Small^0; C vs SS and SSF (P<.1571), S vs SSF (P<.1510), days linear (P<.0092).

Figure 1. Distribution of marbling score, 75 % choice carcasses.

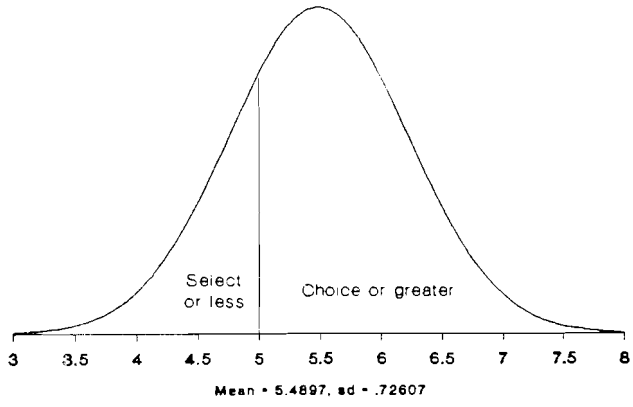

Figure 2. Marbling score vs days on feed.

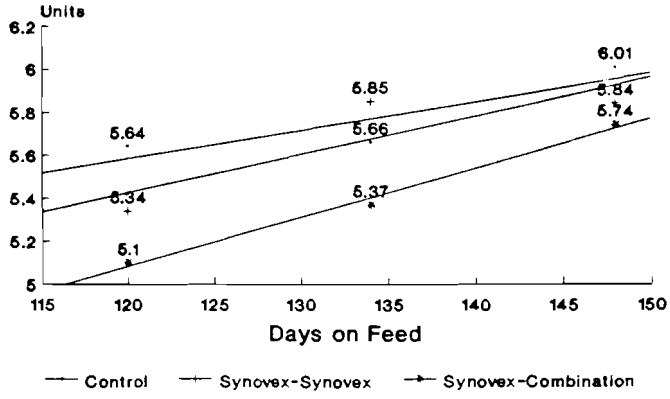

Table 4 lists the equations that describe the relationship between marbling score and days on feed for each treatment (Figure 2). These relationships may not be linear. However, the interaction between days fed and treatment and the quadratic effects of treatment were not significant for marbling score.

TABLE 4. EQUATIONS DESCRIBING THE RELATIONSHIP BETWEEN MARBLING SCORE AND DAYS ON FEED

Treatment	Intercept	Slope
Control	3.9993	.0132
Synovex-S	3.2838	.0179
Combination	2.3405	.0229

The equations in Table 4 were set equal to 5.4897 and solved for days on feed. Days required to reach 75% choice cattle were 113, 124 and 138 for C, SS and SSF steers, respectively. From these data, it appears that two additional weeks on feed as compared to the Synovex-S treatment are needed to overcome the negative effects of Finaplix-S on quality grade.

Use of Finaplix-S as an implant in combination with Synovex-S for finishing steers will improve feedlot performance. However, there are risks involved that influence marketing decisions. Table 5 shows the frequency of undesirable carcass traits during this trial. The percentage of choice carcasses was reduced, the percentage of yield grade 4 carcasses was increased and the percentage of carcasses weighing more than 900 lb was increased in cattle implanted with Finaplix-S as compared with cattle implanted only with Synovex-S. Yield grades were increased because carcass weight increased more than the increase in rib eye area could compensate for in the yield grade equation. If Finaplix-S is used, perhaps cattle should not be sold on a grade and yield basis because of the discounts for select, yield grade 4 or heavy carcasses.

TABLE 5. NEGATIVE EFFECTS OF FINAPLIX-S USE

	Treatment		
Item	Control	SS	SSF
Choice carcasses, %	90	90	76.7
Yield grade 4, %	20	6.7	20
>900 lb HCW	0	10	16.7

Literature Cited

Snedecor, G. W. and W. G. Cochran. 1979. Statistical Methods, 6th Ed. Iowa State University Press, Ames.