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Synovex® C followed by Synovex® Plus™ resulted in a substantial improvement in feed efficiency compared to a single implant of Synovex® Plus™ or a reimplant program with Synovex® S.

Summary

A 145-day finishing trial was conducted to evaluate implant strategies on performance and carcass characteristics of yearling steers. Implanting steers with Synovex® C initially and then reimplanting with Synovex® Plus™ 75 days prior to slaughter improved feed efficiency compared to a single implant of Synovex® Plus™ or a reimplant program using Synovex® S. Carcass quality, as measured by the percentage USDA Choice carcasses and marbling scores, was unaffected by implant strategy. However, implanting steers with Synovex® Plus™ as a single implant or in a reimplant program increased profitability because feed efficiency and carcass weight were increased without decreasing carcass merit.

Introduction

The use of growth-promoting implants has been widely adapted by the cattle feeding industry. Managing implant strategies requires matching payout, animal performance and carcass merit. Several growth-promoting implants varying in dosage and hormonal composition are available. Numerous experiments have demonstrated benefits in performance with a combination of trenbolone acetate and estradiol compared to estradiol alone. However, the percentage of cattle grading Choice can be reduced with this combination. Recently, experiments have demonstrated improved performance, and little change in carcass merit, when steers were implanted with a low-dose estrogen followed by a combination of trenbolone acetate and estradiol, compared to a single combination implant administered at the beginning of the feeding period. In most of these experiments, Ralgro® has been the initial source of low-dose estrogen. Because Synovex® C is similar in estrogenic activity to Ralgro®, it may be an effective source of low-dose estrogen as an initial implant in a reim-

plant program.

Objectives of this trial were to: 1) compare Synovex® C (Syn-C) and Ralgro® (Ralgro) as initial sources of low-dose estrogen and 2) compare a single administration of Synovex® Plus™ (Syn-Plus) versus a reimplant program of Syn-C followed by Syn-Plus versus a reimplant program using only Synovex® S (Syn-S).

Procedure

One hundred and eighty crossbred yearling steers (average initial weight = 722 lb) were used in a randomized complete block design to evaluate implant strategies on performance and carcass characteristics of finishing steers. Steers were blocked by initial weight into five weight replicates. Within each replicate, steers were stratified by body weight to one of four pens (nine steers per pen) such that average pen weights were similar. Pens were randomly assigned to one of four implant treatments (five pens per treatment): 1) Syn-S on day one and day 70, 2) Ralgro on day one followed by Syn-Plus on day 70, 3) Syn-C on day one followed by Syn-Plus on day 70 and 4) Syn-Plus on day one only.

The finishing diet contained 63 percent dry-rolled corn, 22.5 percent wet corn gluten feed, 7.5 percent alfalfa hay, 3 percent tallow and 4 percent dry supplement (DM basis) and was formulated to contain 13.5 percent crude protein, 6.8 percent degradable intake protein, .7 percent calcium, .4 percent phosphorus, .7 percent potassium, 29 g/ton Rumensin and 10 g/ton Tylan. Steers were brought up to full-feed in 17 days using four step-up diets containing 45, 35, 25 and 15 percent alfalfa hay (DM basis). Steers were fed once daily and allowed ad libitum access to feed and water. Feed refusals were collected and weighed as needed throughout the trial.

Steers were weighed initially on two consecutive days after being limit-fed at 2 percent of body weight for six days to minimize differences due to gut fill. Interim body weights were determined on day 70 when appropriate reimplant treatments were applied. Treatment 2 (Ralgro followed by Syn-Plus) was not reimplanted on day 70 under direction of the FDA, and thus, these steers were implanted only on day one with Ralgro. Steers were fed for 75 days following the second implant. Final 145-day body weights were measured on two consecutive days prior to feeding and pencil shrunk 4 percent. Additionally, final body weights were calculated using hot carcass weight adjusted to a common dressing percentage (63). All steers were slaughtered in a commercial processing facility. Hot carcass weights and incidence of liver abscesses were recorded at slaughter. Following a 24-hour chill, fat thickness, longissimus muscle area, yield grade, USDA quality grade, marbling score and maturity score were measured.

Results

The effects of implant strategy on feedlot performance during the 145-day finishing period are presented in Table 1. Under direction from the FDA, steers receiving Ralgro on day one were not reimplanted with Syn-Plus on day 70.

Steers implanted with Syn-Plus on day one consumed more ($P < .05$) feed than those implanted with Ralgro and those initially implanted with Syn-C followed by Syn-Plus (Table 1). Dry matter intakes of steers implanted with Syn-S on day one and 70 were greater ($P < .05$) than those implanted with Ralgro. However, when expressed as a percentage of average body weight, dry matter intakes were similar among implant strategies. Daily gains, expressed on both a live and carcass-adjusted basis, of steers implanted with Syn-Plus on day one or 70 were 4.3 to 6.6 percent higher ($P < .01$) than those implanted with Syn-S on day one and 70, and 18 to 19 percent higher than those implanted with Ralgro only. Daily gains of steers implanted with Syn-C followed by Syn-Plus on day 70 and those implanted with Synovex Plus on day one were similar. Implanting steers with Syn-S on day one and 70 improved ($P < .01$) daily gains 11 (live basis) and 12 percent (carcass basis) compared to those implanted with Ralgro only. Implanting steers with Syn-C followed by Syn-Plus improved ($P < .01$) feed efficiency 3.5 percent on a live basis and tended ($P = .06$) to improve feed efficiency (3.2 percent) on a carcass basis compared to those implanted with Syn-Plus on day one. Implanting steers with Syn-S on day one and 70 improved ($P < .01$) feed efficiency 6 percent on a live basis and 5.2 percent on a carcass basis compared to those implanted with Ralgro only.

The effects of implant strategy

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Table 1. Effect of feedlot implant strategy on performance of finishing yearling steers.

	Implant Strategy[a]				
	1	2	3	4	
Initial implant	Syn-S	Ralgro	Syn-C	Syn-Plus	
Reimplant	Syn-S	None	Syn-Plus	None	SEM
Number of pens	5	5	5	5	
Number of steers	45	45	45	45	
Initial weight, lb	723	721	720	723	.8
Final weight[b], lb	1315[e]	1248[d]	1339[f]	1343[f]	5.1
DM intake					
lb/hd/day	25.9[ij]	24.5[h]	25.5[i]	26.4[j]	.22
% of BW	2.54	2.53	2.43	2.55	.04
Daily gain, lb	4.09[e]	3.63[d]	4.27[f]	4.27[f]	.03
Feed DM/gain	6.34[i]	6.75[h]	5.97[k]	6.18[j]	.04
Carcass adjusted performance[c]					
Final weight, lb	1317[e]	1255[d]	1353[f]	1359[f]	6.1
Daily gain, lb	4.10[e]	3.68[d]	4.37[f]	4.38[f]	.04
Feed DM/gain	6.32[e]	6.67[d]	5.84[f]	6.03[f]	.06

[a]Implant strategy: Syn-S = Synovex® S; Ralgro = Ralgro®; Syn-C = Synovex® C; Syn-Plus = Synovex® Plus™; None = no implant.
[b]Pencil shrunk 4%.
[c]Performance calculated using final weight calculated as hot carcass weight / .63.
[d,e,f]Means in a row not bearing a common superscript differ ($P < .01$).
[h,i,j,k]Means in a row not bearing a common superscript differ ($P < .05$).

on interim feedlot performance are presented in Table 2. During the first 70 days on feed, dry matter intakes as a percentage of body weight were similar among implant strategies. Steers implanted with Syn-Plus gained faster ($P < .05$) and more efficiently ($P < .01$) than those given implants containing estrogen only. Daily gains of steers implanted with Syn-S were higher ($P < .05$) than those implanted with Ralgro, but were similar to those implanted with Syn-C. Additionally, daily gain of steers implanted with Syn-C tended ($P = .12$) to be higher than those implanted with Ralgro. Feed efficiencies were similar for steers implanted with any of the three estrogenic compounds.

During the final 75 days on feed, steers implanted with Syn-S on day one and 70 and Syn-Plus on day one consumed more ($P < .05$) feed than those implanted with Ralgro only, whereas dry matter intake of steers implanted initially with Syn-C followed by Syn-Plus on day 70 was intermediate. Similar to the overall and the first 70 days on feed, dry matter intakes as a percentage of body weight were similar among implant strategies. Steers implanted with Syn-C followed by Syn-Plus on day 70 gained faster ($P < .05$) and more efficiently ($P < .01$) than those receiving the other implant strategies. Implanting steers with Syn-C followed by Syn-Plus on day 70 resulted in a .71 or .42 lb/day increase in daily gain and 22 or 12 percent improvement in feed efficiency compared to Syn-Plus on day one or with Syn-S on day one and 70, respectively. Steers reimplanted with Syn-S on day 70 gained faster ($P < .05$) and more efficiently ($P < .01$) than those implanted with Ralgro or Syn-Plus on day one. During the final 75 days on feed, steers implanted with Syn-Plus on day one maintained their advantage in daily gain ($P < .01$) and feed efficiency ($P = .01$) above those implanted on day one with Ralgro only.

Short intervals between body weight measurements can be misleading. However, these interim data clearly demonstrate steers were becoming less efficient as they approached slaughter weight. Delaying the administration of Syn-Plus until day 70 reduced the magnitude of this change compared to both a single implant of Syn-Plus initially and a reimplant program using Syn-S.

Syn-Plus, administered on day one or 70, increased hot carcass weight ($P < .01$) compared to Ralgro only or a reimplant program using Syn-S (Table 3). Additionally, hot carcass weights of steers implanted with Syn-S were greater ($P < .01$) than those implanted with Ralgro only. Implanting steers with Syn-Plus on day one or 70 increased (Chi square statistic; $P < .01$) the distribution of carcasses weighing between 800 and 900 pounds. However, there was no substantial impact of Syn-Plus, administered on day 0 or 70 on overweight carcasses (>950 lb).

Longissimus muscle area (square

Table 2. Effect of feedlot implant strategy on interim performance of finishing yearling steers.

	Implant strategy[a]				
	1	2	3	4	
Initial implant	Syn-S	Ralgro	Syn-C	Syn-Plus	
Reimplant	Syn-S	None	Syn-Plus	None	SEM
Period 1 (Day 1-70)					
Weight, lb	1064[c]	1048[b]	1056[bc]	1113[d]	4.0
DM intake					
lb/hd/day	25.0[gh]	24.1[f]	24.6[fg]	25.5[h]	.24
% of BW	2.82	2.75	2.75	2.76	.03
Daily gain, lb	4.88[g]	4.67[f]	4.81[fg]	5.57[h]	.06
Feed DM/gain	5.12[b]	5.16[b]	5.11[b]	4.57[c]	.05
Period 2 (Day 71-145)					
Weight, lb	1315[c]	1248[b]	1339[d]	1343[d]	5.1
DM intake					
lb/hd/d	26.8[gh]	24.9[f]	26.4[g]	27.3[h]	.27
% of BW	2.27	2.22	2.17	2.22	.05
Daily gain, lb	3.35[h]	2.67[f]	3.77[i]	3.06[g]	.07
Feed DM/gain	8.00[c]	9.35[b]	7.00[e]	8.93[d]	.17

[a]Implant strategy: Syn-S = Synovex® S; Ralgro = Ralgro®; Syn-C = Synovex® C; Syn-Plus = Synovex® Plus™; None = no implant.
[b,c,d,e]Means in a row not bearing a common superscript differ ($P < .01$).
[f,g,h,i]Means in a row not bearing a common superscript differ ($P < .05$).

Table 3. Effect of feedlot implant strategy on carcass characteristics of finishing yearling steers.

	Implant strategy[a]				
	1	2	3	4	
Initial implant	Syn-S	Ralgro	Syn-C	Syn-Plus	
Reimplant	Syn-S	None	Syn-Plus	None	SEM
Hot Carcass wt, lb	830[e]	791[d]	852[f]	856[f]	3.9
Dressing percentage	63.09	63.34	63.62	63.73	.20
12th rib fat thickness, in	.62	.62	.63	.61	.02
KPH fat[b]	2.30	2.31	2.30	2.32	.05
Longissimus muscle area					
square inches	12.29[gh]	11.95[g]	12.77[h]	12.61[h]	.17
sq. in./cwt HCW	1.49	1.51	1.49	1.48	.02
Yield grade	3.00	3.04	2.91	3.00	.08
Maturity					
Skeletal	A[68]	A[65]	A[69]	A[67]	.02
Lean	A[57]	A[58]	A[56]	A[58]	.02
Overall	A[62]	A[62]	A[62]	A[62]	.01
Marbling score[c]	5.47	5.45	5.32	5.48	.15
Percent Choice[i]	79.6	75.6	68.9	73.3	—
Liver abscesses[j], %	6.7	2.2	0	4.4	—

[a]Implant strategy: Syn-S = Synovex® S; Ralgro = Ralgro®; Syn-C = Synovex® C; Syn-Plus = Synovex® Plus™; None = no implant.
[b]KPH = kidney, heart, and pelvic.
[c]Marbling score of 5.0 = Small 0; 5.5 = Small 50; etc.
[d,e,f]Means in a row not bearing a common superscript differ ($P < .01$).
[g,h]Means in a row not bearing a common superscript differ ($P < .05$).
[i]Chi square statistic ($P = .71$).
[j]Chi square statistic ($P = .32$).

inches) was increased by implanting with Syn-Plus on day one or 70 compared to those implanted with estrogenic compounds. However, expressed in square inches/100 lb of hot carcass weight, longissimus muscle area was unaffected by implant strategy. There was no influence of implant on twelfth rib fat thickness, kidney, heart and pelvic fat, yield grade, lean and skeletal maturity, marbling score, percentage of abscessed livers or the percentage of carcasses grading USDA Choice.

Implanting steers with Syn-C initially and then reimplanting with Syn-Plus 75 days prior to slaughter resulted in a substantial improvement in feed efficiency compared to a single implant of Syn-Plus or a reimplant program using Syn-S. Carcass quality, as measured by the percentage of USDA Choice carcasses and marbling scores, was unaffected by implant strategy. Increased carcass weight without substantial changes in carcass quality should increase economic return when Syn-Plus is utilized as a single implant or in a reimplant program with Syn-C initially compared to reimplant programs using Syn-S.

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