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## Implant Strategies on Performance and Carcass Characteristics of Finishing Steers

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**Table 5. Effect of initial implant (IMP) and overall growth promoting regimen (GP) on ovary development and function<sup>a</sup>,**

Feed additive:	Treatment (Trt) group						Chi-square (P-values) by treatment number					
	None		MGA		None		MGA					
Implant (day 0):	C	C	C	H	H	H	GP					
Implant (day 70):	H/F	H/F	F	H/F	H/F	F	IMP	(1 & 4 vs				
Trt No.:	1	2	3	4	5	6	(1 2 3 vs	2 & 5 vs	1 & 4 vs	3 & 6 vs	2&3 vs	
							4 5 6)	3 & 6)	2 3 5&6	1 2 4 & 5	5&6	
Missing, %	0.0	0.0	0.0	2.9	0.0	0.0	.31	.35	.15	.48	—	
Very immature, (<15mm), %	0.0	0.0	0.0	0.0	0.0	0.0	—	—	—	—	—	
Immature, (15-20mm), %	5.7	0.0	0.0	5.7	5.9	0.0	.36	.08	.05	.08	.14	
Mature, (>20mm, no follicle), %	28.6	35.3	17.6	34.3	38.2	20.6	.66	.41	.35	.02	.49	
Mature (graafian follicle), %	60.0	61.8	82.4	54.3	52.9	73.5	.36	.37	.39	.01	.21	
Mature (multiple follicle), %	5.7	2.9	0.0	2.9	2.9	5.9	.67	.83	.54	.79	.26	
Mature (Corpus Luteum), %	0.0	0.0	0.0	0.0	0.0	0.0	—	—	—	—	—	

<sup>a</sup>C= Synovex-C, H = Synovex-H, F = Finaplix-H, and MGA = Melengestrol acetate, fed from day 28 to 170.

implanting with Finaplix alone reduced the number of immature ovaries and number of mature ovaries with no follicle, but increased the number of mature ovaries with graafian follicles. Heifers not fed MGA had the greatest number of immature ovaries. However, these

heifers were the most efficient in feed conversion (lower feed to gain ratio).

Data suggest optimum growth promotant systems for heifer calves, managed under the above-mentioned conditions, includes an initial implant with either Synovex-C or Synovex-H,

followed by reimplant with Synovex-H and Finaplix-H.

<sup>1</sup>Mari Lubberstedt, research technician, Terry Mader, professor, Animal Science and Jill Heemstra, former research technician, Northeast Research and Extension Center, Concord; and Kelly Lechtenberg, Consultant Midwest Veterinary Research, Oakland, Nebraska.

# Implant Strategies on Performance and Carcass Characteristics of Finishing Steers

**Rob Cooper  
Todd Milton  
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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.

*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.*

plants 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-

## 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*

## 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 im-

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

(Continued on next page)

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

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

<sup>a</sup>Implant strategy: Syn-S = Synovex® S; Ralgro = Ralgro®; Syn-C = Synovex® C; Syn-Plus = Synovex® Plus™; None = no implant.

<sup>b</sup>Pencil shrunk 4%.

<sup>c</sup>Performance calculated using final weight calculated as hot carcass weight / .63.

<sup>d,e,f</sup>Means in a row not bearing a common superscript differ ( $P < .01$ ).

<sup>h,i,j,k</sup>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

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

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

<sup>a</sup>Implant strategy: Syn-S = Synovex<sup>®</sup> S; Ralgro = Ralgro<sup>®</sup>; Syn-C = Synovex<sup>®</sup> C; Syn-Plus = Synovex<sup>®</sup> Plus<sup>™</sup>; None = no implant.

<sup>b,c,d,e</sup>Means in a row not bearing a common superscript differ ( $P < .01$ ).

<sup>f,g,h,i</sup>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.**

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

<sup>a</sup>Implant strategy: Syn-S = Synovex<sup>®</sup> S; Ralgro = Ralgro<sup>®</sup>; Syn-C = Synovex<sup>®</sup> C; Syn-Plus = Synovex<sup>®</sup> Plus<sup>™</sup>; None = no implant.

<sup>b</sup>KPH = kidney, heart, and pelvic.

<sup>c</sup>Marbling score of 5.0 = Small 0; 5.5 = Small 50; etc.

<sup>d,e,f</sup>Means in a row not bearing a common superscript differ ( $P < .01$ ).

<sup>g,h</sup>Means in a row not bearing a common superscript differ ( $P < .05$ ).

<sup>i</sup>Chi square statistic ( $P = .71$ ).

<sup>j</sup>Chi square statistic ( $P = .32$ ).

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



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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<sup>1</sup>Rob Cooper, research technician, Animal Science, Lincoln; Todd Milton, assistant professor, Animal Science, Lincoln; Frank Prouty, Fort Dodge Animal Health, Overland Park, Kansas.

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## Feedlot Marketing/Sorting Systems to Reduce Carcass Discounts

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**Dillon Feuz<sup>1</sup>**

### Introduction

Our objective was to evaluate feedlot marketing/sorting systems. The primary goal of these systems is not to optimize marketing, which attempts to obtain maximum value for each individual animal, but to avoid carcass discounts. The primary discounts addressed were overweight and overfat carcasses. While underweight and underfat carcasses were addressed, less emphasis was placed on these discounts.

Two levels of technology were compared in this project: 1) a fat estimate made by rib palpation and 2) use of ultrasound for determination of fat depth at reimplant time. Objectives were to: 1) determine if potential discount carcasses could be identified at reimplant time and 2) determine if use of ultrasound was necessary for accurate fat depth determination.

### Procedure

Five Nebraska feedlots (ranging in one-time capacity of 3,500 to 25,500 head), participated in the project. Co-operating feedlots were responsible for cattle procurement. Upon arrival, cattle were randomly split into three treat-

ment groups: control (no sorting); low tech sort; and high tech sort. At initial processing, all cattle were processed according to the feedlot's normal procedures, identified with individual ear tags and individually weighed. All cattle were sent to their respective pens and fed according to the feedlot's normal procedures.

At reimplant time (or the last time the cattle were worked before slaughter, which might have been processing time for some short-fed yearlings), all cattle were again worked according to the feedlot's normal reimplant procedure. The control pen was worked first, individually weighed and a fat depth estimated by hand palpation over the twelfth and thirteenth ribs. Based on the average weight and distribution of weights in the control pen, maximum and minimum sort weights were determined. These sort weights were calculated as 1.5 standard deviations from the average, approximately 8 percent of the cattle on both ends of the range of weights. Maximum and minimum sort fat depths were determined in the same manner. Cattle in the low tech treatment pen were individually weighed and a fat depth estimated by visual appraisal and rib

(Continued on next page)

Potential Yield Grade 4 carcasses were not identified at reimplant time. Fat depth determined approximately 90 days prior to slaughter did not correlate to carcass fat depth.

### Summary

*A project involving 4,348 cattle and five commercial feedlots in Nebraska was conducted to evaluate marketing/sorting systems to reduce overweight and overfat carcasses. At reimplant time, cattle were weighed and fat depth estimated either by ultrasound or by manual rib palpation. Cattle heavier and/or fatter than a predetermined weight and fat depth were identified for early sale. The system of sorting did not reduce carcass discounts. Reimplant fat depth was poorly correlated to carcass fat depth. At reimplant time (~90 days prior to slaughter), we were unable to consistently identify cattle which would become Yield Grade 4 carcasses.*