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Implant Programs for Feedlot Heifers Using Synovex® Plus™

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Implanting feedlot heifers with Synovex Plus improves ADG and cost of gain compared to heifers implanted with Finaplix-H and fed MGA. MGA maintains carcass quality.

Summary

Two commercial feedyard experiments evaluated implant strategies for feedlot heifers. In both experiments, implanting heifers with Synovex Plus increased ADG compared to heifers implanted with Finaplix-H and fed MGA. In Experiment 1, implanting heifers with Synovex Plus improved feed conversion and increased live basis net returns, and the use of MGA with Synovex Plus increased carcass merit basis net returns and had similar marbling scores compared with Finaplix-H and MGA.

Introduction

Growth-promoting implants are widely used by the cattle feeding industry. Implants can vary in composition, dosage and carrier. Implants can have different effects on animal performance and carcass characteristics, changing economic returns. Implants can have a single active compound as well as combination of active compounds. An implant that is commonly used in finishing heifers is Finaplix-H. Finaplix-H contains 200 mg of trenbolone acetate (TBA). Melengestrol acetate (MGA) is routinely supplemented in feedlot heifers implanted with Finaplix-H to enhance TBA activity. Synovex Plus has been recently approved for use in finishing heifers. Synovex Plus is a combination implant, containing 28 mg estradiol benzonate (20 mg E_2) and 200 mg TBA. Objectives of these trials were to: 1) compare performance, carcass characteristics, and feeding economics in heifers implanted with Synovex Plus or Finaplix-H and 2) determine if MGA supplementation is beneficial in finishing heifers implanted with Synovex Plus.

Procedure

Experiment 1.

Eight hundred seventy-nine heifers (726 lb) were randomly allotted to one of three implant programs and assigned to one of 15 pens (5 replications/treatment) on arrival to the feedyard. Heifers were kept separate by truck load-lot and randomly assigned to the three implant treatments in groups of two head by a gate sort. Within a replication, all heifers arrived at the feedyard at the same time. After sorting, pens were reweighed, processed and moved to their home pen. During processing, heifers were vaccinated, treated for internal and external parasites, implanted with Ralgro®, and given a lot-tag for identification.

Initial weights were calculated by prorating pen weights, obtained between sorting and processing, back to the group's original pay weight. Hot carcass weight was adjusted to a common dressing percentage of 63% to determine final weight.

Reps of heifers were reimplanted with either Synovex Plus or Finaplix-H, on average, 90 days (range 84 to 101) prior to harvest. Heifers assigned to Finaplix-H were fed MGA once they were stepped up to the final diet (20 days on feed). Additionally, one Synovex Plus treatment was fed MGA once they were stepped up to the final diet (20 days on feed). The final diet contained 57.0% steam-flaked corn, 16.9% dry-rolled corn, 9.1% supplement, 7.5% alfalfa hay, 6.5% corn steep liquor and 3.0% fat, and was formulated to contain 13.6% CP, 7.0% crude fat, 0.77% Ca, 0.40% P and 0.77% K. Heifers were fed an average of 149 days (range 128 to 172). All pens within a replication were harvested under identical conditions. Hot carcass weights were recorded on the day of harvest. Carcass fat thickness, marbling score, KPH fat, longissimus muscle area and U.S.D.A quality grade were recorded following a 24 to 36 hour chill.

Performance, carcass and economic data were analyzed using the General Linear Model of SAS. LS Means were used to separate treatment differences. Additionally, independent contrasts were used to compare: 1) the average of Synovex Plus, with and without MGA supplementation, versus Finaplix-H with MGA supplementation and 2) Synovex Plus without MGA supplementation versus the average of Synovex Plus and Finaplix-H when MGA was fed. Quality and yield grade distributions and the percentage of dark cutting carcasses were analyzed using the frequency procedure (Proc Freq) of SAS. Variables were considered significant when probability values less than .10 were obtained.

Experiment 2.

Eight hundred seventy heifers (828 lb) were used in a randomized complete block design. The pen of heifers was the experimental unit. Six pens were used, resulting in three experimental observations for each implant treatment. Heifers were blocked by arrival date into the feedyard. Heifers were processed on arrival and maintained in three large pens until reimplanting. At reimplanting, heifers were randomly allotted to treatments by sorting individual heifers at chute-side. Thus, if the first heifer received Synovex Plus, the second heifer through the chute would have been implanted with Finaplix-H, and so on. All heifers were fed a finishing diet con-

taining 78.0% dry-rolled corn, 11.0% corn steep liquor, 6.8% alfalfa hay and 4.2% supplement, and was formulated to contain 13.3% CP, 4.5% crude fat, 0.75% Ca, 0.40% P and 0.77% K. The finishing diet contained MGA for both treatments.

Initial weights were determined on individual heifers at the time of reprocessing. Final weights were determined by adjusting hot carcass weight to a common 63% dressing percentage. Heifers were slaughtered at a commercial packing facility and carcass characteristics were determined following a 36 to 48-hour chill. Carcass measurements included: hot carcass weight, marbling score, KPH fat, 12th rib fat thickness, longissimus muscle area and U.S.D.A. quality grade.

Data were analyzed as a randomized complete block design using the General Linear Model of SAS. Treatment means were separated using a t-test protected by a significant overall F-test. Distribution of U.S.D.A. quality and calculated yield grades were analyzed using the frequency procedure (Proc Freq) of SAS. Differences between implant treatments were considered significant when probability values were less than .10.

Table 1. Effect of implant strategy on performance and carcass characteristics in finishing heifers (Experiment 1).

	Implant Strategy[a]			
Item	SynPlus No MGA	SynPlus MGA	FinH MGA	SEM[b]
Number of pens	5	5	5	
Number of heifers	294	292	293	
Days on feed	149	149	149	
Initial weight, lb	725	722	732	3.0
Final weight, lb[c]	1211	1221	1209	7.8
Dry matter intake, lb	19.0	19.2	19.1	.15
Daily gain, lb[d]	3.27[e]	3.35[f]	3.19[g]	.04
Feed/gain[d]	5.81[h]	5.74[h]	6.00[i]	.05
Carcass weight, lb	765	771	762	3.9
12th rib fat, in.[k]	.48[h]	.55[i]	.51[j]	.01
Longissimus muscle area, sq. in.[l]	14.3[h]	14.0[hg]	13.6[g]	.22
Calculated yield grade[kl]	2.44[h]	2.72[i]	2.80[i]	.08
Marbling score[klm]	5.19[h]	5.46[i]	5.42[i]	.04
Quality grade distribution[n], %				
Prime	1.0	3.8	1.0	
Upper 2/3 Choice	17.0	20.9	19.6	
Low Choice	38.8	43.8	53.2	
Select	41.8	29.8	25.9	
Standard	1.4	1.7	.3	
Dark cutters[o], %	1.3	0	0	

[a]SynPlus No MGA = Synovex Plus fed no MGA; SynPlus MGA = Synovex Plus fed MGA; FinH MGA = Finaplix-H fed MGA.
[b]SEM = Standard error of the mean.
[c]Final weight calculated as hot carcass weight divided by .63 (common dressing percentage).
[d]Contrasts of Synovex Plus treatments versus Finaplix-H differ (P < .05).
[e,f,g]Means within a row with different superscripts differ (P < .10).
[h,i,j]Means within a row with different superscripts differ (P < .05).
[k]Contrasts of MGA treatments versus no MGA differ (P < .05).
[l]Contrasts of Synovex Plus treatments versus Finaplix-H differ (P < .10).
[m]Marbling score: 4.0 = Slight; 4.5 = Slight 50; 5.0 = Small; 5.5 Small 50; etc.
[n]Chi square statistics: Prime (P < .02); upper 2/3 Choice (P = .49); low Choice (P < .01); Select (P < .01); Standard (P = .27).
[o]Chi square statistic (P = .13)

Economic Analysis for Experiment 1 and 2.

The economic influence of the implant treatments was determined using the ration cost at the feedyard during the period the experiment was conducted. The ration cost used in the analysis includes markup in Experiment 1. Non-feed costs (medicine, processing, etc.) were calculated for each pen of heifers in the experiment and averaged. This average non-feed cost was applied to each pen of heifers for calculation of cost of gain and net profit(loss). Final heifer value was calculated by using a live price or a carcass price based on individual heifer carcass value. Carcass value was calculated based on U.S.D.A. quality grade, calculated yield grade, carcass weight and nonconformance (i.e. dark cutters). A carcass base price of $105/cwt was used for low Choice, yield grade 3 carcasses weighing 550 to 950 lb. Discounts were calculated as: $10, Select; $20, Standard; $30, dark cutters; $25, light (<550 lb) and heavy (>950 lb) carcasses; and $15, yield grades 4 and 5. Premiums were calculated as: $8, Prime; $3, upper 2/3 Choice; and $3, yield grades 1 and 2.

Results

In both experiments, data are presented with deads and railers removed from the analysis. Feed intake and head days were adjusted one day prior to the removal of the animal from the pen as either a dead or railer.

Experiment 1.

Dry matter intake was similar among treatments. Heifers implanted with Synovex Plus gained 3.8% faster (P = .01) and were 3.9% more efficient (P = .01) than those implanted with Finaplix-H (Table 1). Heifers implanted with Synovex Plus and fed MGA had higher (P < .05) daily gains compared both to heifers implanted with Synovex Plus fed no MGA and heifers implanted with Finaplix-H fed MGA.

Carcass characteristics are presented in Table 1. Heifers implanted with Synovex Plus as the terminal implant had lower (P = .07) calculated yield grades and increased longissimus muscle area (P = .06) compared with those implanted with Finaplix-H. Marbling scores (P < .01) and the percentage of carcasses grading U.S.D.A. low Choice (P < .01) were reduced and the percentage of carcasses grading Select was increased (P < .01) when heifers not being fed MGA were implanted with Synovex Plus compared with the Finaplix-H/MGA program. Feeding MGA with the use of Synovex Plus as the terminal implant eliminated any deleterious effects on

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carcass quality as indicated by a higher (P < .01) percentage of U.S.D.A. Prime carcasses, little change in the percentage of U.S.D.A. Choice carcasses, and similar (P = .47) marbling scores compared with the Finaplix-H/MGA program. There was no effect of treatment on the percentage of upper 2/3 Choice or Standard grading carcasses. There was no influence of treatment on the incidence of dark cutting carcasses.

Feeding MGA, either when heifers were implanted with Synovex Plus or Finaplix-H, increased 12th rib fat thickness (P < .01), calculated yield grade (P = .01), and marbling score (P < .01). The percentages of carcasses grading U.S.D.A. Prime (P = .02) and low Choice (P < .01) increased with feeding MGA. This experiment demonstrates that Synovex Plus can be used effectively with MGA to increase performance without compromising carcass quality relative to a program using Finaplix-H and MGA.

Experiment 2.

Dry matter intake was similar between the implant strategies (Table 2). Heifers implanted with Synovex Plus gained 4.1% (P = .02) faster compared with those implanted with Finaplix-H. Feed conversion was similar between implant strategies.

Carcass characteristics are presented in Table 2. Carcass weight of heifers implanted with Synovex Plus was 10 lb heavier (P = .10) compared with those implanted with Finaplix-H. Longissimus muscle area, 12th rib fat thickness, yield grade and marbling score were similar between heifers implanted with Synovex Plus or Finaplix-H. Additionally, the distribution of U.S.D.A. quality grade was similar between implant treatments.

Economic Analysis for Experiment 1 and 2.

A summary of the economic analysis is provided in Table 3. In experiment 1, cost of gain was improved (P = .01) with Synovex Plus compared with Finaplix-H. On a live basis, net profit(loss) was increased (P = .03) $14.00 or $9.01

Table 2. Effect of implant strategy on performance and carcass characteristics in finishing heifers (Experiment 2).

	Implant Strategy[a]			
Item	SynPlus MGA	FinH MGA	SEM[b]	P-value[c]
Number of pens	3	3		
Number of heifers	432	438		
Days on feed	107	107		
Initial weight, lb	829	826	5.5	.77
Final weight, lb[d]	1183	1166	4.2	.11
Dry matter intake, lb	21.7	21.0	.37	.32
Daily gain, lb	3.31	3.18	.01	.02
Feed/gain	6.55	6.62	.13	.75
Carcass weight, lb	745	735	2.6	.10
12th rib fat, in.	.54	.55	.02	.91
Longissimus muscle area, sq. in.	13.5	13.3	.04	.10
Calculated yield grade	2.92	2.96	.05	.71
Marbling score[e]	5.65	5.69	.11	.83
Quality grade distribution[f], %				
Prime	3.7	4.0		
Upper 2/3 Choice	32.9	32.4		
Low Choice	38.4	39.9		
Select	23.1	23.1		
Standard	1.7	.7		

[a]SynPlus MGA = Synovex Plus fed MGA; FinH MGA = Finaplix-H fed MGA.
[b]SEM = Standard error of the mean.
[c]T-test of significance between implant treatments.
[d]Final weight calculated as hot carcass weight divided by .63 (common dressing percentage).
[e]Marbling score: 4.0 = Slight; 4.5 = Slight 50; 5.0 = Small; 5.5 Small 50; etc.
[f]Chi square statistics: Prime (P = .80); upper 2/3 Choice (P = .88); low Choice (P = .88); Select (P = .94); Standard (P = .19).

Table 3. Feeding economics of heifers implanted with Synovex Plus, with or without MGA supplementation, or Finaplix-H and MGA.

	Implant Strategy[a]				
Item	SynPlus No MGA	SynPlus MGA	FinH MGA	SEM[b]	P-value[c]
Experiment 1					
Ration cost[d], $/ton	131.00	132.50	132.50		
Cost of feed, $/head	185.78	190.05	189.58	1.4	
Non-feed cost[e], $/head	9.91	9.91	9.32		
Total feeding cost, $/head	195.69	199.96	198.90	1.4	
Cost of gain[f], $/cwt	40.11[g]	40.03[g]	41.72[h]	.35	
Carcass value[fij], $/cwt	102.43[k]	103.27[l]	103.99[m]	.28	
Profit(loss)[n], $/head					
Live basis[f]	83.96[gh]	88.95[g]	74.95[h]	3.7	
Carcass merit basis	81.20[k]	91.63[l]	80.68[k]	3.8	
Experiment 2					
Ration cost, $/ton	—	85.00	85.00		
Cost of feed, $/head	—	98.26	95.11	1.7	.32
Non-feed cost[e], $/head	—	51.00	51.00		
Total feeding cost, $/head	—	149.26	146.11	1.7	.32
Cost of gain, $/cwt	—	42.25	43.11	.60	.42
Carcass value[j], $/cwt	—	103.84	103.90	.35	.91
Profit(loss)[n], $/head					
Live basis	—	39.62	33.81	2.4	.23
Carcass merit basis	—	44.41	38.68	2.1	.19

[a]SynPlus No MGA = Synovex Plus fed no MGA; SynPlus MGA = Synovex Plus fed MGA; FinH MGA = Finaplix-H fed MGA.
[b]SEM = Standard error of the mean.
[c]T-test of significance between implant treatments.
[d]Includes feed mark-up.
[e]Average of all medicine, processing, and other costs for all replications in experiment and appropriate implant costs per treatment.
[f]Contrasts of Synovex Plus treatments versus Finaplix-H differ (P < .05).
[g,h]Means within a row with different superscripts differ (P < .05).
[i]Contrasts of MGA treatments versus no MGA differ (P < .05).
[j]Calculated using a $105/cwt carcass base price: discounts = $10, Select; $20, Standard; $15, yield grade 4 and 5; $30, dark cutter; premiums = $8, Prime; $3, upper 2/3 Choice; $3, yield grades 1 and 2.
[k,l,m]Means within a row with different superscripts differ (P < .10).
[n]Initial animal cost = $70/cwt; animal returns based on $65/cwt live cash price or calculated carcass value, respectively, interest not included.

when heifers were implanted with Synovex Plus with or without MGA supplementation, respectively, compared to Finaplix-H with MGA supplementation. When carcass discounts and premiums were applied to calculate profit(loss), heifers implanted with Synovex Plus without MGA supplementation were similar to those implanted with Finaplix-H and fed MGA. The reductions in percentage of cattle grading low Choice in this experiment were large enough, using a $10 Choice/Select spread, to offset the advantage in cost of gain. Although not statistically different, the incidence of dark cutting carcasses was included in this calculation at a discount of $30/cwt. The additive effect of implanting heifers with Synovex Plus and feeding MGA increased carcass merit returns ($P < .09$) by $10.95 per head compared to the Finaplix-H, MGA fed heifers.

In experiment 2, cost of gain was not significantly influenced by implant treatment. Overall profit(loss) tended (live basis, $P = .23$; carcass basis, $P = .19$) to be greater for heifers implanted with Synovex Plus.

These data suggest that Synovex Plus can be used in feedlot heifers to enhance daily gain and improve net live basis profit(loss) compared with a implant program using Finaplix-H. Carcass quality is similar between heifers implanted with Synovex Plus or Finaplix-H when MGA is included in the diet, increasing overall net carcass merit profit(loss) in Synovex Plus heifers.

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