Table 1. Effect of Implant Treatment on Performance of Yearling Heifers

Treatment	IH	RH	R200	FH	SEM	Trt P-value
No. Pens	5	5	5	5		
No. Head	440	447	443	447		
Initial Wt, lbs.	771	781	777	777	2.0	
LIVE BASIS						
Final Wt, lbs[1].	1147[b]	1166[a]	1168[a]	1148[b]	3.9	.003
ADG, lbs.	3.10[bc]	3.18[ab]	3.23[a]	3.06[c]	.034[d]	.0159
DM Intake, lbs.	18.57[e]	18.85[d]	18.80[de]	18.31[f]	.095	.0065
Feed to Gain	6.01[a]	5.95[ab]	5.84[b]	5.99[a]	.046	.0846
CARCASS - ADJUSTED BASIS						
Final Wt, lbs[3].	1150[f]	1161[e]	1173[d]	1145[f]	4.3	.003
ADG, lbs.	3.12[ef]	3.14[e]	3.27[d]	3.04[f]	.035	.0035
Feed to Gain	5.97[b]	6.02[b]	5.76[a]	6.04[b]	.052	.0097

[1] Final live weight minus 4% shrink.
[3] Hot carcass weight divided by 63.47% (average dressing percent of all treatments)
[a, b, c, d, e, f] Means in a row without a common superscript differ ([a, b, c] P< .05; [d, e, f] P< .10)

Table 2. Effect of Implant Treatment on Carcass Traits of Yearling Heifers

Treatment	IH	RH	R200	FH	SEM	Trt P-value
No. Pens	5	5	5	5		
No. Head	440	447	443	447		
Hot Carcass Wt., lbs.	730[f]	737[e]	745[d]	727[f]	2.7	.002
Dressing %	63.59[ab]	63.23[c]	63.74[a]	63.31[bc]	.123	.039
Marbling Score[1]	449	450	432	453	6.4	.158
Dark Cutters, %	.46	0	.22	.22	.296	.75
<550 lbs., %	.46	.22	0	.22	.211	.52
QUALITY GRADE DISTRIBUTIONS						
Prime%	5.9[a]	4.9[a]	2.5[b]	4.5[ab]	.87	.08
Premium Choice[2], %	15.3	18.1	15.5	18.8	2.80	.75
Low Choice, %	43.1	44.1	41.2	47.1	2.81	.53
Prime & Choice, %	64.3[de]	67.1[d]	59.2[e]	70.4[d]	2.75	075
Select, %	35.0[ab]	31.6[b]	39.9[a]	28.7[b]	2.66	.059
No roll, %	.7	1.3	.9	.9	.62	.89

[1] Score of 400 = Small[0]; 500 = Modest[0], etc.
[2] Upper 2/3 of Choice grade.
[a, b, c, d, e, f] Means in a row without a like superscript differ ([a,b,c] P < .05; [d,e,f] P < .10).

Table 2. Effect of Implant Treatment on Carcass Traits of Yearling Heifers Con't.

Treatment	IH	RH	R200	FH	SEM	Trt P-value
YIELD GRADE DISTRIBUTIONS						
YG 1, %	10.1	9.1	12.4	7.8	1.99	.45
YG 2, %	41.6	35.0	35.3	38.4	2.10	.15
YG 3, %	41.5	46.3	45.0	44.8	2.61	.61
YG 4, %	6.8	9.6	6.8	8.7	1.19	.29
YG 5, %	0	0	.4	.2	.25	.58

Table 3. Effect of Implant Treatment on Body Fat Measurements of Yearling Heifers.

Treatment	IH	RH	R200	FH	SEM	Trt P-value
BODY FAT CALCULATION						
YG 1 & 2's %	51.68	41.10	47.76	46.20	1.99	.16
YG 4 & 5's %	6.8	9.6	7.2	8.9	1.23	.37
AVG YG	2.45^{e}	2.56^{d}	2.47^{e}	2.55^{d}	.01	.08
Empty Body Fat [1]	32.25^{i}	32.53^{g}	32.35^{hi}	32.46^{gh}	0.06	.08
AFBW [2]	1101.92^{de}	1085.80^{ef}	1119.08^{d}	1074.86^{f}	7.30	.02
AFBWCHG [3]	55.06^{f}	93.66^{d}	61.87^{ef}	85.77^{de}	8.81	.04

$^{a, b, c, d, e, f, g, h, i}$ Means in a row without a like superscript differ (^{a,b,c} P < .05; ^{d,e,f} P < .10; $^{g, h, I}$ P< .15).
[1] Calculated using equations from Perry and Fox (J. Anim. Sci. 75:300-307).
[4] Adjusted final body weight at 29% empty body fat
[5] Adjusted final body weight change calculated as (final body weight – AFBW).

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Technical Bulletin 3

Evaluation of Implants Containing Different Combinations of Trenbolone Acetate and Estradiol on Performance and Carcass Merit of Short-Fed Finishing Heifers

W.T. Nichols, J.P. Hutcheson, G.E. Sides and C.D. Reinhardt
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Summary Points

- A total of 1,796 yearling heifers (776 lbs.) were used in a randomized complete block design with 5 pen replicates per treatment.
- Treatments were:
  1) Revalor-IH (80 mg trenbolone acetate & 8 mg estradiol) on day 0 (IH)
  2) Revalor-H (140 mg trenbolone acetate & 14 mg estradiol) on day 0 (RH)
  4) Revalor-200 (200 mg trenbolone acetate & 20 mg estradiol) on day 0 (R200)
  5) Finaplix®-H (200 mg trenbolone acetate) on day 0 (FH)
- All heifers were fed .4 mg of MGA® (melengesterol acetate) daily.
- Heifers implanted with R200 gained faster ($P < .10$) and had better feed-to-gain ratios (F/G) than those implanted with IH or FH, but were not different ($P > .10$) than those implanted with RH on a live basis. Daily gain on a live basis by RH heifers was greater ($P < .10$) than for FH heifers.
- Heifers implanted with R200 gained faster ($P < .10$) and had better feed-to-gain ratio than heifers in any other treatment group on a carcass-adjusted basis. The average improvement in F/G for R200 heifers was 4.2%.
- Hot carcass weights were heavier ($P < .10$) for R200 heifers than for any other implant treatment group.
- Implanting with R200 resulted in a lower ($P < .10$) percentage of Prime & Choice carcasses compared to FH (11.2 percentage unit difference) or RH (7.9 percentage unit difference), but was not different than IH.
- In this study, R200 improved rate and efficiency of gain, hot carcass weights, dressing percentage compared to other implant treatments, R200 reduced the number of Prime and Choice carcasses when compared to RH and FH, but was not different from IH.

Evaluation of Implants Containing Different Combinations of Trenbolone Acetate and Estradiol on Performance and Carcass Merit of Short-Fed Finishing Heifers

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I. Summary

A total of 1,796 yearling heifers (776 lbs.) were used in a randomized complete block design to evaluate the effects of implants with different levels and combinations of estradiol (E2) and trenbolone acetate (TBA) on performance and carcass traits. Treatments were: 1) Revalor-IH (80 mg of trenbolone acetate & 8 mg of estradiol) (IH), 2) Revalor-H (140 mg of trenbolone acetate & 14 mg estradiol) (RH), 3) Revalor-200 (200 mg trenbolone acetate & 20 mg estradiol) (R200), and 4) Finaplix-H (200 mg trenbolone acetate) (FH). Rations were based on high-moisture ear corn and wheat. All heifers were fed .4 mg of MGA (melengesterol acetate) per head daily, starting with the finishing ration. Heifers were fed for an average of 121 days. Marbling scores and U.S.D.A. Quality and Yield Grade data were obtained following a 24-hr. carcass chill. On a live basis, heifers implanted with R200 gained faster ($P < .10$) than those implanted with IH or FH, but were not different ($P>.10$) than those implanted with RH. Daily gain by RH heifers was greater ($P < .10$) than for FH heifers. Feed conversion (F/G) was improved ($P < .05$) for R200 heifers vs. either IH (2.8%) or FH (2.5%) heifers, but not RH. On a carcass-adjusted basis, heifers implanted with R200 gained faster ($P < .10$) than heifers in any other treatment group. Similarly, heifers implanted with R200 required less ($P < .05$) feed per unit of gain than any other implant treatment. The average improvement in F/G for R200 heifers was 4.2%. Hot carcass weights were heavier ($P < .10$) for R200 heifers than for any other implant treatment group. Further, heifers implanted with RH had heavier ($P < .10$) carcass weights than heifers implanted with either IH or FH. Dressing percentage was higher ($P < .05$) for heifers implanted with R200 than for heifers implanted with RH or FH. Implanting with R200 resulted in a lower ($P < .10$) percentage of Prime & Choice carcasses compared to FH (11.2 percentage unit difference) or RH (7.9 percentage unit difference). Implanting with R200 also increased ($P < .05$) the percentage of Select carcasses compared to RH or FH. Distribution of Yield Grades were unaffected by implant treatment. In this study, R200 improved rate and efficiency of gain, hot carcass weights and dressing percentage compared to other implant treatments. R200 reduced the number of Prime and Choice carcasses when compared to RH and FH, but was not different from IH. Since the lowest dose (IH) and the highest dose (R200) were not different it may be more of an indication of level of finish, rather than a treatment response.

II. Introduction

Growth-promoting implants have been proven to be safe and highly beneficial management tools for beef production during the finishing phase. Recent research results have demonstrated that implant strategy management can enable producers to reap the benefits of improved production efficiency, while minimizing the negative effects on marbling score and quality grade. Demands for improved carcass quality will likely be heightened in the future, as marketing of beef to packers and retailers continues to evolve into a value-based economic system. Therefore, it is of interest to evaluate the effects of implants with different levels and combinations of estradiol (E2) and trenbolone acetate (TBA) on performance and carcass traits of heifers.

III. Materials and Methods

A total of 2,070 yearling heifers were received in five blocks for this study. Heifers were predominately British crossbred with some British x Continental influence. All heifers originated from backgrounding lots in Idaho and Oregon, and were in moderate to moderately fleshy condition. Heifers comprising a complete block were shipped to a Southern Idaho Research Facility on the same day. Sources of heifers that made up each block were penned separately on arrival. The following day, heifers were processed and assigned at random to one of four treatments. Where multiple sources were involved, heifers originating from the first source were processed and randomized to each treatment. The second source was similarly processed, and this procedure was repeated so that each source of heifers was equally represented within each treatment group. Processing consisted of eartagging with a lot tag and individual identification number (both ears), vaccination against IBR, BVD, PI3, and BRSV (MLV vaccine), treatment with an endectocide for internal and external parasites, and administration of the appropriate implant. Complete blocks of heifers were received on different dates to allow a staggered start to the study. Heifers in block 1 (421 head) were received on February 7, 2001, heifers in block 2 (408 head) on February 12, heifers in block 3 (407 head) on February 14, heifers in block 4 (406 head) on February 21, and heifers in block 5 (428 head) on February 28. In each case, the blocks were started on trial the day after arrival. The trial was started with either 89 (block 1) or 90 (blocks 2-5) head per pen, resulting in a total of 1,796 heifers being used in this study.

Heifers within a block were randomly assigned to one of four treatments: 1) Revalor-IH (IH) 2) Revalor-H (RH) 3) Revalor-200 (R200) and 4) Finaplix-H (FH). Implants were administered at initial processing. The same individual implanted all heifers used in the study. Treatment groups within each block were randomly assigned to one of four contiguous pens.

Heifers were stepped up to a high-concentrate diet using two transition rations and a finish ration. Heifers were placed on the finishing ration within 24 to 27 days of trial initiation. Average composition of the finish ration (DM basis) was: 39.00% high moisture ear corn, 12.75% dry rolled corn, 35.75% dry rolled wheat, 3.5% alfalfa hay, 1.25% canola meal, 4.00% liquid supplement, and 3.75% fancy bleachable tallow. Average actual nutrient concentrations of the finish ration (DM basis) were: 13.26% CP, .71% Ca, .36% P, and .73% K. The finish ration also contained (DM basis) 31 g/ton of monensin and 9 g/ton of tylosin. All heifers were fed .4 mg of MGA (melengestrol acetate) per head daily, starting with the finishing ration.

Animals were rejected from the study, or "realized", if 1) they resided in a hospital pen for ten or more consecutive days, 2) they were treated with antibiotics three times, or 3) if they were injured, crippled or had an obviously chronic condition. Dry matter intake for cattle in the hospital was calculated as 50% of the home pen's daily average for each day the animal was in the hospital. All dead and realized cattle were weighed at the time of removal.

Heifers were harvested in complete blocks when it was determined that they were of sufficient weight and degree of finish for marketing. The result was that heifers were fed an average of 121 days in this study. Actual days on feed for blocks 1, 2, 3, 4, and 5 were 111, 115, 130, 123, and 126, respectively. The trial was conducted from February to July of 2001.

Heifers were weighed off the study, shipped approximately 50 miles to a commercial packing facility, and slaughtered the same day. Hot carcass weights were obtained at slaughter. Marbling scores and U.S.D.A. Quality and Yield Grades were obtained following a 24-hour carcass chill. Marbling determinations for all carcasses were made by the same individual.

Data were analyzed using GLM procedures of SAS (1986) for a randomized complete block design (RCBD) experiment. Model effects included block and treatment. Means were separated using least significant difference, when a significant ($P < .10$) F ratio for treatment existed. Pen served as the experimental unit.

IV. Results and Discussion

Performance Data

Performance analysis. Heifers implanted with RH consumed more dry matter (P < .10) than those implanted with IH, with intake by R200 heifers being intermediate to both. Heifers implanted with FH consumed less dry matter (P < .10) than any other treatment group. Heifers implanted with R200 gained faster (P < .10) than those implanted with IH or FH. Daily gain by RH heifers was greater (P < .10) than for FH heifers. Feed conversion (F/G) was improved (P < .05) for R200 heifers vs. either IH (2.8%) or FH (2.5%) heifers. Additionally, feed conversion by R200 heifers tended (P = .12) to be improved compared to RH heifers.

Carcass-adjusted performance. Heifers implanted with R200 gained faster (P < .10) than heifers in any other treatment group. Further, heifers implanted with RH gained faster (P < .10) than those implanted with FH. Similarly, heifers implanted with R200 required less (P < .05) feed per unit of gain than any other implant treatment. The improvement in F/G for R200 heifers was 4.2% compared to the average of the other three treatments.

Carcass Data

Hot carcass weights were heavier (P < .10; Table 2) for heifers implanted with R200 than for any other implant treatment group. Further, heifers implanted with RH had heavier (P < .10) carcass weights than heifers implanted with either IH or FH. Dressing percentage was higher (P < .05) for heifers implanted with R200 than for heifers implanted with RH or FH. Also, heifers implanted with IH had a higher (P < .05) dressing percentage than heifers implanted with RH.

Average marbling scores (Table 2) did not differ (P = .158) between treatments, although differences were noted for the percentage of carcasses grading U.S.D.A. Prime, the total percentage grading U.S.D.A Prime & Choice, and the percentage of U.S.D.A. Select carcasses. Heifers implanted with R200 had a lower (P < .05) percentage of Prime carcasses than heifers implanted with IH or RH. Implanting with R200 also resulted in a lower (P < .10) percentage of Prime & Choice carcasses compared to FH (11.2 percentage unit difference) or RH (7.9 percentage unit difference). Implanting with R200 also increased (P < .05) the percentage of Select carcasses compared to RH or FH.

Implant treatment had no effect (P > .15) on the distribution of U.S.D.A. Yield Grades in this study. Further, no treatment effect was observed for the incidence of dark-cutting carcasses, or the percentage of lightweight (<550 lb.) carcasses.

Implant effects on Body Fat Measurements are shown in Table 3. RH and FH both had slightly higher overall fat measurements in comparison to IH and R200. This is somewhat interesting in that the lowest dose implant (IH) and the highest dose implant (R200) were very similar in body fat measurements. The empty body fat calculations were 32.25% and 32.35% for IH and R200 respectively, in comparison to 32.53% and 32.47% respectively for RH and FH. The yield grade distributions also followed this same pattern. The average yield grades for IH and R200 were 2.45 and 2.47, respectively, while the average yield grades for RH and FH were 2.56 and 2.55, respectively. Similarly, percentages of yield grade 4 & 5's were lower and percentages of Yield grade 1 & 2's were higher for both IH and R200 in comparison to either RH or FH. These data indicated no significant differences in marbling score between treatments. However, numerically, both IH and R200 had lower marbling scores than either RH or FH. This is also reflected in the percentage of carcasses grading prime, choice, or select. IH was intermediate to all implant treatments while R200 significantly affected these quality grade measurements in comparison to RH and FH. However since the lowest dose implant (IH) and the highest dose implant (R200) were very similar in body fat measurements, it entices one to wonder if the effects on quality grade were a random effect more characterized by total body fat, rather than an implant effect.