

Evaluation of non-implanted, Revalor[®]-IS/S re-implant program, and Revalor[®]-XS Delayed-Release implant in Finishing Steers



Summary Points

- Three hundred sixty English X Continental crossbred steers (initial wt = 671 lb) were used in a randomized complete block design experiment and fed for 177 days.
- Treatments included a non-implanted control, Revalor-IS on day 1 followed by Revalor-S on day 75, and Revalor-XS (200 mg trenbolone acetate and 40 mg estradiol in a proprietary delayed release formula) on day 1 only (12 pens/treatment).
- All treatments were weighed individually on days 35, 75, 140, and prior to shipment for slaughter.
- At 28.6% body fat, final weight of implanted steers was 96 lb heavier ($P < 0.01$). Actual final weight was 114 to 127 lb heavier ($P < 0.01$) for implanted steers than for steers that were not implanted. Actual final weight and weight at 28.6% body fat were not different ($P > 0.05$) among steers given Revalor-IS/S and Revalor-XS. Implanting resulted in 85 lb more carcass weight ($P < 0.01$) in comparison to non-implanted steers, and implanted steers exhibited higher ($P < 0.01$) dressing percents than non-implanted steers.
- Dry matter intake was 10.7% higher ($P < 0.01$) and ADG was 22.3% (live basis) to 25.0% (carcass basis) greater ($P < 0.01$) for implanted steers than for non-implanted steers. Thus, feed efficiency was improved ($P < 0.01$) by 10.1% (live basis) to 12.1% (carcass basis) for implanted steers. Steer DMI was greater (0.9 lb; $P < 0.01$) for steers receiving Revalor-XS than for steers receiving Revalor-IS/S, but ADG and feed efficiency did not differ among these treatments.
- Implanted steers had a greater dressing percent, more rib fat, more body fat, a higher average yield grade, a lower marbling score, a larger Longissimus area, and fewer premium carcasses ($P < 0.05$) than non-implanted steers. Carcass characteristics did not differ between steers receiving Revalor-IS/S and those receiving Revalor-XS.

These data demonstrate there is no difference in average daily gain, carcass gain, and feed conversion when comparing Revalor-XS given on day one to Revalor-IS given on day one followed by a reimplant of Revalor-S 75 days later. This trial indicates that with the use of Revalor-XS in long-fed steers, reimplanting is not necessary.

Summary

Three hundred sixty English X Continental yearling steers were used in a randomized complete block design to evaluate the efficacy of a delayed-release implant formulation under development (Revalor-XS). Treatments included a non-implanted control, Revalor-IS on day 1 followed by a reimplant of Revalor-S on day 75, and Revalor-XS on day 1 only.

Implanted steers were 114 to 127 lb heavier on a live basis and 123 to 139 lb heavier on a carcass basis ($P < 0.01$) at slaughter than steers that were not implanted. The estimated weight at which cattle should have contained 28.6% body fat was increased by 96 lb ($P < 0.01$) by implanting. Overall ADG by implanted steers was 22.3% (live basis) to 25.0% (carcass basis) greater ($P < 0.01$) than non-implanted steers. Implanted steers also consumed 10.7% more dry matter ($P < 0.01$) than non-implanted steers, which resulted in feed efficiency being improved from 10.1% (live basis) to 12.1% (carcass basis; $P < 0.01$) when steers were implanted. Steer DMI was greater (0.9 lb; $P < 0.01$) for steers receiving Revalor-XS than for steers receiving Revalor-IS/S, but ADG and feed efficiency did not differ among these treatments. Implanting resulted in an average of 85 lb more carcass weight ($P < 0.01$), whereas dressing percent was greater ($P < 0.01$) for implanted steers than for non-implanted steers.

Implanted steers produced carcasses that had greater rib fat thickness, more body fat, a higher average yield grade, but a lower marbling score ($P < 0.05$) than non-implanted steers. Carcasses of implanted steers also had a larger Longissimus area, but a lower ratio of Longissimus area to carcass weight ($P < 0.05$) than non-implanted steers. Implanted steers produced fewer Premium and more Select carcasses ($P < 0.01$) despite producing fewer yield grade 2 carcasses ($P < 0.05$) than non-implanted steers. Steers receiving Revalor-XS or Revalor-IS initially and a reimplant of Revalor-S displayed greater ADG (22%), higher dry matter intake (10%), improved feed efficiency (10%), and fewer premium carcasses compared to non-implanted steers.

Introduction

Growth-promoting implants have been a cost-effective tool to improve the efficiency of beef production. Implants have little effect on body fat gain, but dramatically increase body protein gain compared to nonimplanted cattle (Montgomery et al., 2001). A selection of ETBA doses is currently available in the marketplace, but a second implant is commonly administered to steers on feed beyond approximately 120 days. This report describes the efficacy of an experimental Revalor-XS formulation compared to a Revalor-IS/Revalor-S implant program in finishing steers.

Materials and Methods



Six hundred eighty two crossbred steers that had been grazing wheat pasture were received at the study site in Texas on 4 - 5 March 2002. Steers were primarily large-framed, English X Continental breed type, and displayed thin body condition. Steers were processed on 8 March 2002. Processing included tagging, vaccination against viral antigens (Titanium 5), vaccination against clostridial toxins (Vision 7; Intervet, Millsboro, DE), and treated for internal (Safeguard; Intervet, Millsboro, DE) and external parasites (Spotton; Bayer Animal Health). Steers were revaccinated with Titanium 5 on day 75 of the study (3 June 2002). Steers were acclimated to the facility for at least 14 days, and 360 steers were selected and enrolled in the study on 19 March 2002. Cattle were blocked by weight and randomized to treatments of no implant, Revalor-IS on day 1 and Revalor-S on day 75, and Revalor-XS on day 1 only. Treatments were administered and cattle were sorted into 36 study pens (12 pens/treatment, 10 animals/pen) on 20 March 2002. The Revalor-XS product contains 6 coated delayed release pellets and 4 uncoated standard pellets (20 mg TBA and 4 mg estradiol/pellet).

Steers were housed in soil-surfaced pens with 94 sq. ft. of pen space/animal and 21 inches of bunk space/animal. Steers were allowed ad libitum access to feed that was fed twice daily throughout the study. Steers were fed a 77% concentrate diet based on steam-flaked corn for 43 days and the finishing ration (92% concentrate, based on steam-flaked corn) was fed for 134 days. Steers were weighed on days 35, 75, 140, and prior to shipment for slaughter. Refused feed was collected and weighed each weigh day and as necessary when inclement weather compromised the quality of remaining feed in the bunk; refused feed was not re-fed to study cattle. Dry matter of a composite sample of refused feed was determined when refused feed was collected.

Cattle health was observed daily. Cattle removed from the study due to death or health reasons were removed from calculations for growth performance. Dry matter intake by removed animals was assumed to be equal to 1 X the average individual intake by the pen during the time frame of interest for each animal removed. Therefore, data are presented on a dead-out basis.

Initial and final weights were pencil shrunk 4% to calculate growth performance. Three replications of steers were shipped to a commercial slaughter facility on 4 separate dates; 27 August, 2 September, 24 September, and 1 October 2002. Cattle were fed for an average of 177 days. Hot carcass weight was collected after slaughter and remaining carcass data were collected on each chilled carcass by trained personnel. Fat contained in the body and estimated weight at equal body fat between treatments was determined using carcass measurements and equations described by Guiroy et al. (2001).

Data were analyzed as a randomized complete block design and pen was considered the experiment unit in all analyses. Interim feedlot performance from days 1 to 35, 36 to 75, and 76 to 140 were analyzed as repeated measures to assess responses across time using Mixed procedures of SAS. The model included the fixed effects of treatment, day, and day X treatment, and block served as a random effect. The spatial power covariance structure was used for the repeated effect of day because of the unequal spacing of interim periods, and the subject was defined as block X treatment. Overall growth performance, hot carcass weight, rib fat thickness, ribeye area, and average yield grade data were analyzed using Mixed procedures of SAS; the model included the fixed effect of treatment and block served as random effect. The distribution of carcass quality and yield grades was analyzed using Glimmix procedures of SAS using the same model effects as described for overall growth performance. Means were separated using the contrasts of the non-implanted control vs implanted treatments and Revalor-IS/S vs Revalor-XS. Means were declared as statistically different when the probability that treatment differences were due to randomness was less than 5% (e.g., $P < 0.05$).

Results and Discussion

Nine steers received therapy during the course of the study, primarily for respiratory disease. Based on morbidity and condition of the cattle, cattle were revaccinated as described previously at reimplanting (day 75). Five steers were removed during the course of the study due to death, and all treatments were represented. Body weights and estimated dry matter intake for these animals were removed from the data set before analysis as described. In addition, complete carcass data were not obtained on 30 carcasses shipped on 1 October, but data were acquired from at least 50% of the animals in an affected pen that were slaughtered on that date.

From day 1 to 75 (Table 1), implanted steers gained 0.18 lb more weight/day and consumed 1.1 lb more dry matter/day ($P < 0.01$) than non-implanted steers. Feed efficiency was improved by 10.9% ($P < 0.01$) when steers were implanted. Among implanted cattle, steers receiving Revalor-XS gained 0.27 lb more weight/day and were 4.4% more efficient than steers receiving Revalor-IS/S ($P < 0.01$). Interim DMI and ADG are presented in Figure 1 for illustrative purposes.

Over the entire feeding period, implanted steers were 114 to 127 lb heavier on a live basis and 123 to 139 lb heavier on a carcass basis ($P < 0.01$; Table 1) at slaughter than steers that were not implanted. The estimated weight at which cattle should have contained 28.6% body fat was increased by 96 lb ($P < 0.01$) by implanting. Overall ADG by implanted steers was 22.3% (live basis) to 25.0% (carcass basis) greater ($P < 0.01$) than non-implanted steers. Implanted steers also consumed 10.7% more dry matter ($P < 0.01$) than non-implanted steers, which resulted in feed efficiency being improved from 10.1% (live basis) to 12.1% (carcass basis; $P < 0.01$) when steers were implanted. Steer DMI was greater (0.9 lb; $P < 0.01$) for steers receiving Revalor-XS than for steers receiving Revalor-IS/S, but ADG and feed efficiency did not differ among these treatments.

Implanting resulted in an average of 85 lb more carcass weight ($P < 0.01$; Table 2), whereas dressing percent was greater ($P < 0.01$) for implanted steers than for non-implanted steers. Implanted steers produced carcasses that had greater rib fat thickness, more body fat, a higher average yield grade, and a lower marbling score ($P < 0.05$) than non-implanted steers. Carcasses of implanted steers had a larger Longissimus area, but a lower ratio of Longissimus area to carcass weight ($P < 0.01$) than non-implanted steers. Implanted steers produced fewer premium and more Select carcasses ($P < 0.01$) despite producing fewer yield grade 2 carcasses ($P < 0.05$) than non-implanted steers.

In summary, steers receiving Revalor-XS or Revalor-IS initially and a reimplant of Revalor-S displayed greater ADG (22%), higher dry matter intake (10%), and improved feed efficiency (10%) compared to non-implanted steers. Fewer carcasses of implanted steers were graded as average Choice or greater.

References

- Guiroy, P. J., D. G. Fox, L. O. Tedeschi, M. J. Baker, and M. D. Cravey. 2001. Predicting individual feed requirements of cattle fed in groups. *Journal of Animal Science* 79:1983-1995.
- Montgomery, T. H., P. F. Dew, and M. S. Brown. 2001. Optimizing carcass value and the use of anabolic implants in beef cattle. *Journal of Animal Science* 79(Electronic Supplement):E296-E306.



Figure 1

Interim DMI (1a) and ADG (1b) by steers receiving either no implant, a reimplant of Revalor-IS/S, or Revalor-XS^{u, v}

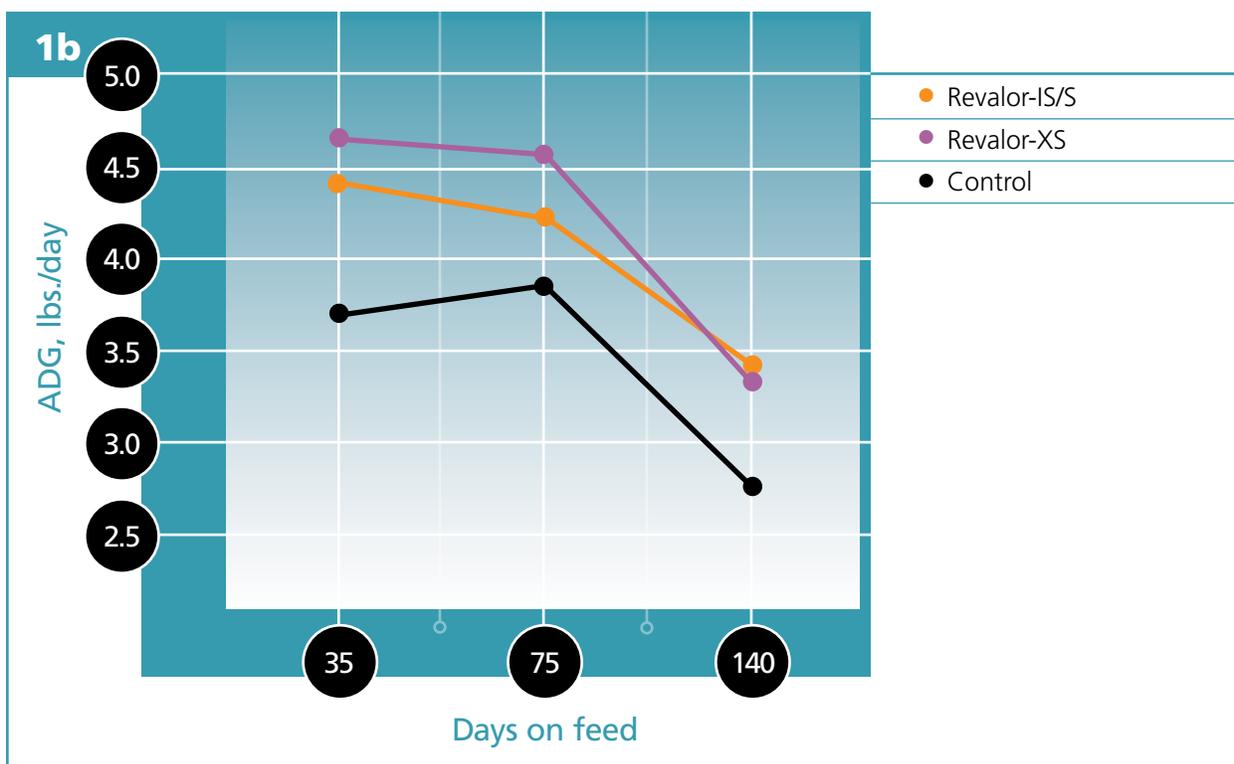
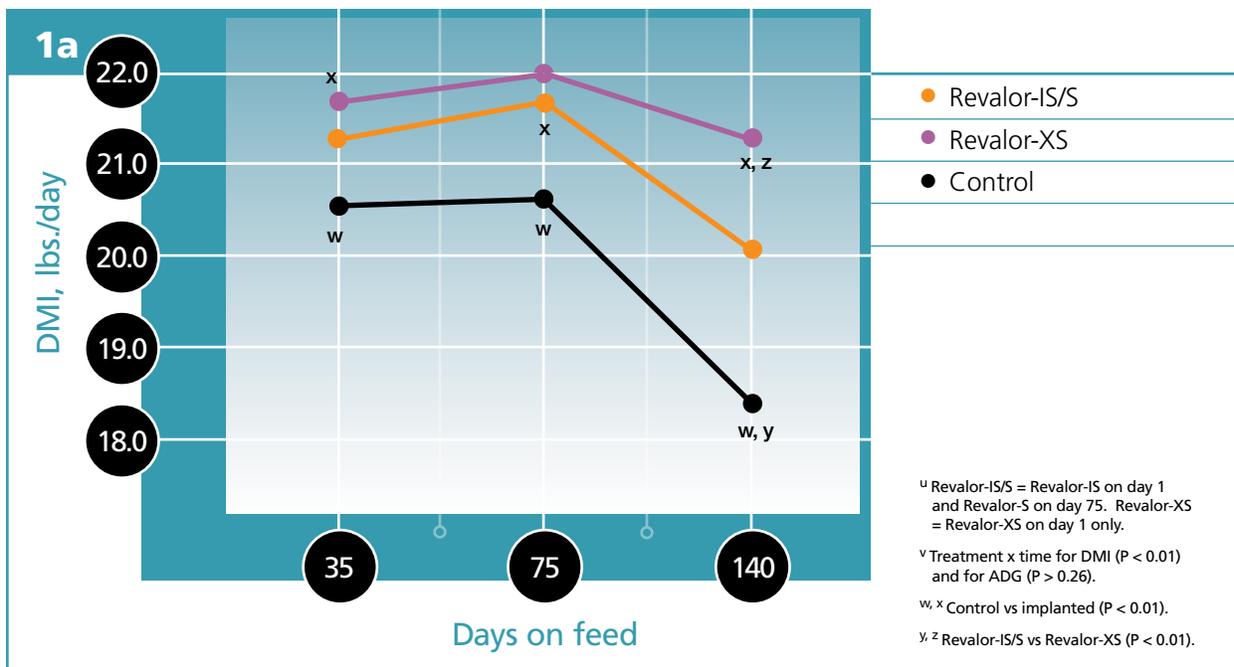


Table 1

Growth performance by steers receiving either no implant, a reimplant of Revalor-IS/S, or Revalor-XS^a

Item	No Implant	Reimplant Revalor-IS/S	Revalor-XS	Standard Error	Contrast ^b
Number of pens	12	12	12	-	-
Number of cattle	119	118	118	-	-
Initial weight, lb ^c	671	671	671	14	-
Final weight, lb ^c	1193	1307	1320	9	1**
LIVE BASIS (day 1 to 75)					
Reimplant wt, lb ^c	941	980	1001	14	1**, 2**
ADG, lb/day	3.60	4.13	4.40	0.06	1**, 2**
DMI, lb/day	20.5	21.4	21.8	0.3	1**
Feed efficiency	5.71	5.20	4.97	0.11	1**, 2**
LIVE BASIS (day 1 to 177)					
ADG, lb/day	2.95	3.60	3.67	0.05	1**
DMI, lb/day	19.1	20.7	21.6	0.03	1**, 2**
Feed efficiency	6.48	5.76	5.89	0.08	1**
CARCASS BASIS (day 1 to 177)					
Final weight, lb ^d	1185	1308	1324	9	1**
Weight at 28.6% body fat ^e	1115	1211	1212	15	1**
ADG, lb/day	2.91	3.60	3.69	0.05	1**
Feed efficiency	6.58	5.75	5.86	0.09	1**

^a Revalor-IS/S = Revalor-IS on day 1 and Revalor-S on day 75. Steers receiving Revalor-XS received the implant on day 1 only, but all cattle were removed from the pen on day 75.

^b Contrast 1 = Nonimplanted vs implanted and 2 = Revalor-IS/S vs Revalor-XS. Statistical significance is identified as ** = P < 0.01 and * = P < 0.05.

^c A 4% pencil shrink was applied to full weight.

^d Final shrunk weight was calculated as pen hot carcass weight ÷ (overall dressing percent ÷ 100).

^e Calculated according to equations described by Guiroy et al. (2001; *Journal of Animal Science* 79:1983).



Table 2

Carcass characteristics of steers receiving either no implant, a reimplant of Revalor-IS/S, or Revalor-XS^a

Item	No Implant	Reimplant Revalor-IS/S	Revalor-XS	Standard Error	Contrast ^b
Number of pens	12	12	12	-	-
Number of cattle	110	109	106	-	-
Hot carcass weight, lb	765	845	855	6	1**
Dressing percent	64.1	64.6	64.8	0.1	1**
LDA, in ²	13.2	14.0	13.9	0.2	1**
LDA/100 lb carcass wt	1.70	1.66	1.65	0.02	1*
Marbling score ^c	45	41	40	0.9	1**
KPH, %	2.02	2.01	2.00	0.03	-
Ribfat, in	0.64	0.70	0.72	0.02	1*
Average yield grade	3.19	3.38	3.50	0.1	1*
Empty body fat, % ^d	30.9	31.6	32.0	0.3	1*
QUALITY GRADE DISTRIBUTION^e					
Prime and Choice	63.4	49.7	44.2	-	1**
≥ Average Choice, %	31.3	15.6	13.9	-	-
Low Choice, %	32.1	34.1	30.3	-	-
Select, %	34.9	44.9	53.3	-	1**
Standard, %	1.7	5.4	2.5	-	-
YIELD GRADE DISTRIBUTION					
Yield grade 1, %	8.3	5.7	5.2	-	-
Yield grade 2, %	33.2	27.3	17.9	-	1*
Yield grade 3, %	39.9	41.9	47.1	-	-
Yield grade 4 and 5, %	18.6	25.1	29.8	-	-

^a Revalor-IS/S = Revalor-IS on day 1 and Revalor-S on day 75. Steers receiving Revalor-XS received the implant on day 1 only, but all cattle were removed from the pen on day 75.

^b Contrast 1 = Nonimplanted vs implanted and 2 = Revalor-IS/S vs Revalor-XS. Statistical significance is identified as ** = P < 0.01 and * = P < 0.05.

^c Slight = 30 to 39, Small = 40 to 49, etc.

^d Calculated according to equations described by Guiroy et al. (2001; *Journal of Animal Science* 79:1983).

^e Quality grade assigned by marbling score only and excludes the influence of skeletal maturity.



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