Revalor®-XS (trenbolone acetate and estradiol) TECH BULLETIN

MERCK Animal Health

Key Highlights

- Steers administered a REVALOR®-IS/200 or REVALOR®-XS/200 re-implant program did not differ in live performance.
- Steers administered a REVALOR®-XS/200 re-implant program tended to have greater carcass weights and had greater ribeye area and a more favorable USDA yield grade distribution compared with steers administered a REVALOR®-IS/200 re-implant program.
- Utilizing REVALOR®-XS as an initial implant allows for greater flexibility in determining terminal implant windows.

Evaluation of REVALOR®-XS (trenbolone acetate and estradiol) as an initial implant in re-implant program utilizing REVALOR®-200 (trenbolone acetate and estradiol) as a terminal implant: a three-study pooled summary.

ABSTRACT

Growth performance and carcass data from three large-pen feedlot studies were pooled to evaluate the use of REVALOR®-XS as an initial implant in a re-implant program. The three studies consisted of 2,764 steers and 40 pens, with an initial body weight (BW) of 598 lbs. Treatments consisted of a REVALOR®-IS (trenbolone acetate and estradiol) (80 mg TBA and 16 mg E_2) administered on arrival, followed by a REVALOR®-200 (200 mg TBA and 20 mg E_2) terminal implant (IS/200) or a REVALOR®-XS (80 mg TBA and 16 mg E_2 uncoated; 120 mg TBA and 24 mg E_2 coated; 200 mg TBA and 40 mg E_2 total) on arrival followed by a REVALOR®-200 terminal implant (XS/200). Steers were fed to equal days-on-feed (DOF) within each study and averaged 210 DOF overall. Steers within each treatment were re-implanted at the same DOF in two studies (Day 124 on average followed by an 81-day terminal implant window). In the third study, REVALOR®-IS steers were implanted on Day 120 and REVALOR®-XS steers on Day 140 of the 217-day study. Final live BW averaged 1,400 and 1,406 lbs. for IS/200 and XS/200, respectively ($P=0.21$). There were no differences ($P>0.26$) in DMI, live ADG and live Feed:Gain between treatments. Carcass-adjusted final BW ($P=0.06$) and ADG ($P=0.09$) tended to be greater with XS/200 compared with IS/200. Carcass-adjusted Feed:Gain did not differ ($P=0.13$) between treatments. Hot carcass weight tended to be greater ($P=0.07$) with XS/200 (909 lbs.) compared with IS/200 (901 lbs.). Ribeye area was greater ($P<0.01$) and calculated yield grade lower ($P<0.01$) with XS/200 compared with IS/200. Fat thickness tended ($P=0.06$) to be greater with IS/200 compared with XS/200. Distribution of USDA quality grades was not affected ($P=0.26$) by treatment. Distribution of USDA yield grades was affected ($P=0.01$) by treatment with a general shift toward more yield grade 1 and 2 carcasses with XS/200 and more yield grade 4 and 5 carcasses with IS/200. This pooled analysis indicates that using REVALOR®-XS as an initial implant in a re-implant program leads to greater carcass weights and ribeye area and lower yield grades when compared with REVALOR®-IS.

INTRODUCTION

Long-acting implants, such as REVALOR®-XS, are used extensively in the U.S. feedlot industry. REVALOR®-XS contains four uncoated pellets that will begin to release hormone (payout) immediately upon implantation and six coated pellets that will begin to pay out approximately 70 days after implantation. This allows for labor savings and reduces the risk of cattle injury and feed intake disruptions by eliminating the need for re-implanting. REVALOR®-XS is labeled as a 200-day implant. Therefore, when steers are on feed for more than 200 days, a re-implant program may be necessary.

Research comparing a single REVALOR®-XS implant with an aggressive re-implant program utilizing a 200 mg TBA, 20 mg E_2 terminal implant has generally shown a growth performance advantage for the aggressive re-implant program (McLaughlin, et al., 2013; Merck Animal Health Technical Bulletins BV-51327-184d and BV-51327-204d). Further research suggested that the ideal terminal implant window (with non-coated conventional implants) for steers to maximize feed efficiency and average daily gain is between 85 and 100 days (Coulson, et al., 2019). Limiting the terminal implant window to 100 days or less implies that two conventional implants may be insufficient to maximize feedlot performance when cattle are fed for longer than 200 days. The use of REVALOR®-XS as an initial implant in a re-implant program may be warranted when steers are fed for 200 days or more.

The objective of this study was to analyze pooled data from three large-pen studies to compare the effect of a REVALOR®-IS/200 re-implant regimen with a REVALOR®-XS/200 re-implant regimen on feedlot performance and carcass characteristics in steers.

MATERIALS AND METHODS

The three large-pen feedlot studies used for this pooled analysis are described in Table 1. A total of 2,764 crossbred steers (598 lbs. initial BW) in 40 pens were utilized in these studies. Upon enrollment in each study, cattle were implanted with one of two implant regimens: REVALOR®-IS (80 mg TBA, 16 mg E_2) initial implant followed by a REVALOR®-200 (200 mg TBA, 20 mg E_2) terminal implant (IS/200) or a REVALOR®-XS (80 mg TBA and 16 mg E_2 uncoated; 120 mg TBA and 24 mg E_2 coated; 200 mg TBA and 40 mg E_2 total) initial implant followed by a REVALOR®-200 terminal implant (XS/200). In two studies, steers were re-implanted after the same number of days-on-feed regardless of treatment (Day 115 and Day 133), while in one study, steers in the IS/200 treatment were re-implanted on Day 120, and steers in the XS/200 treatment were re-implanted on Day 140. Within each individual study, steers were fed to a common days-on-feed. Total days-on-feed were 195, 215 and 217 days for the three studies, with an average of 210 days-on-feed across studies. Terminal implant windows were 80, 82 and 77 (XS/200) or 97 (IS/200) days for each individual study, with an average terminal implant window of 87 days for IS/200 and 79 days for XS/200. Further details on materials and methods for individual studies can be found in their respective technical bulletins.

Data were analyzed with Proc Glimmix in SAS (version 9.4) using linear mixed models with binomial and Gaussian distributions for health proportions and continuous data, respectively. Implant regimen was a fixed effect, while random effects included pens within blocks and blocks within trials. Distributions of USDA quality and yield grade were analyzed in linear mixed models for ordinal outcomes with implant regimen as a fixed effect and random effects of individual study, block and pen.

Table 1. Details for studies included in pooled analysis.[1]

Study Site	Pens (Head)	Days-on-Feed	Re-Implant Day	Terminal Implant Window (days)
Nebraska	12 (937)	195	115	80
Nebraska	12 (901)	215	133	82
Montana	16 (926)	217	120 (IS/200 treatment)	97 (IS/200 treatment)
			140 (XS/200 treatment)	77 (XS/200 treatment)

[1]Individual studies are detailed in Merck Animal Health Technical Bulletins BV-51327-2-195d, US/RV2/1218/0002 and BV-51327-2-217d.

RESULTS

Animal morbidity, mortality and removals can be found in Table 2. Live and carcass-adjusted performance variables can be found in Table 3. There were no treatment differences ($P>0.29$) for morbidity, mortality or removals; therefore, data are presented on a deads- and removals-out basis. Dry matter intake (23.5 lbs./day across treatments), live final BW (1,403 lbs.), ADG (3.81 lbs.) and Feed:Gain (6.18 lbs. of feed/lb. of gain) did not differ between treatments ($P>0.20$). Carcass-adjusted final BW tended ($P=0.06$) to be greater with XS/200 (1,446 lbs.) compared with IS/200 (1,434 lbs.). Carcass-adjusted ADG also tended ($P=0.09$) to be greater with XS/200 (4.01 lbs.) compared with IS/200 (3.96 lbs.). Carcass-adjusted Feed:Gain did not differ ($P=0.13$) between treatments and averaged 5.95 and 5.85 for IS/200 and XS/200, respectively.

Carcass characteristics can be found in Table 4. Data were available for only two of the studies for ribeye area and fat thickness. Data from all three studies were available for all other measurements. Dressing percentage was not affected ($P=0.20$) by treatment and averaged 63.6% across treatments. Hot carcass weight tended ($P=0.07$) to be greater with XS/200 (909 lbs.) compared with IS/200 (901 lbs.). Ribeye area was increased ($P<0.01$) with XS/200 (14.73 sq. in.) compared with IS/200 (14.16 sq. in.). Fat thickness tended ($P=0.06$) to be greater with IS/200 (0.559 in.) compared with XS/200 (0.527 in.). Calculated yield grade was greater ($P<0.01$) with IS/200 (3.10) compared with XS/200 (2.93).

Distribution of USDA quality grades was not affected ($P=0.26$) by treatment. Steers graded, on average, 67.1% Choice + Prime. Distribution of USDA yield grades was affected ($P<0.01$) by treatment. The shift in yield grade was generally toward leaner (lower yield grade) carcasses with XS/200 and fatter (higher yield grade) carcasses with IS/200. Percentage yield grade 1 and 2 carcasses measured 32.8% with IS/200 and 39.9% with XS/200. Percentage yield grade 3 and 4 carcasses measured 20.6% with IS/200 and 14.4% with XS/200.

Though live animal performance was not affected by treatment in this pooled analysis, treatment did affect carcass characteristics. In particular, the 8-lb. advantage in hot carcass weight with XS/200, combined with greater ribeye area, lower fat thickness and improved yield grade, suggests that the increased hormone concentration and long-acting formulation of REVALOR®-XS may positively affect carcass weight and other carcass characteristics. The average study length in this analysis was 210 days. In cattle on feed longer than 210 days, it is reasonable to assume that the use of REVALOR®-XS as an initial implant would be even more beneficial than REVALOR®-IS in a re-implant program. REVALOR®-XS as an initial implant can also provide added flexibility in targeting an optimal terminal implant window.

Table 2. Morbidity, mortality and removals when steers were initially implanted with REVALOR®-IS or REVALOR®-XS followed by re-implant with REVALOR®-200.[1,2]

Item	IS/200	XS/200	*P*-Value
Morbidity, % (SEM)	10.41 (1.45)	9.58 (1.36)	0.45
Mortality, % (SEM)	2.29 (0.56)	1.74 (0.46)	0.30
Removals, % (SEM)	1.57 (0.42)	1.76 (0.46)	0.67

[1]Treatments: REVALOR®-IS (80 mg TBA, 16 mg E_2) initial implant followed by a REVALOR®-200 (200 mg TBA, 20 mg E_2) terminal implant (IS/200) and REVALOR®-XS (80 mg TBA and 16 mg E_2 uncoated; 120 mg TBA and 24 mg E_2 coated; 200 mg TBA and 40 mg E_2 total) initial implant followed by a REVALOR®-200 terminal implant (XS/200). Average days-on-feed = 210. Average re-implant day = 123 for IS/200 and 131 for XS/200.

[2]SEM: Standard error of the mean.

Table 3. Live (deads and removals out) and carcass-adjusted performance when steers were initially implanted with REVALOR®-IS or REVALOR®-XS followed by re-implant with REVALOR®-200.[1]

Item	IS/200	XS/200	SEM[2]	*P*-Value
Initial BW[3], lbs.	597.6	597.4	12.9	0.97
Final BW[3], lbs.	1,400	1,406	14	0.21
DMI, lbs./day	23.50	23.49	0.25	0.97
ADG, lbs.	3.79	3.83	0.05	0.27
Feed:Gain	6.20	6.15	0.08	0.29
Gain:Feed	0.162	0.163	0.002	0.26
Carcass-Adjusted[4]				
Final BW, lbs.	1,434	1,446	14	0.06
ADG, lbs.	3.96	4.01	0.04	0.09
Feed:Gain	5.95	5.85	0.06	0.13
Gain:Feed	0.169	0.171	0.002	0.13

[1]Treatments: REVALOR®-IS (80 mg TBA, 16 mg E_2) initial implant followed by a REVALOR®-200 (200 mg TBA, 20 mg E_2) terminal implant (IS/200) and REVALOR®-XS (80 mg TBA and 16 mg E_2 uncoated; 120 mg TBA and 24 mg E_2 coated; 200 mg TBA and 40 mg E_2 total) initial implant followed by a REVALOR®-200 terminal implant (XS/200). Average days-on-feed = 210. Average re-implant day = 123 for IS/200 and 131 for XS/200.

[2]SEM: Standard error of the mean.

[3]4% shrink applied.

[4]Adjusted by dividing hot carcass weight by average dressing % within each study.

Table 4. Carcass characteristics when steers were initially implanted with REVALOR®-IS or REVALOR®-XS followed by re-implant with REVALOR®-200.[1]

Item	IS/200	XS/200	SEM[2]	*P*-Value
Hot Carcass Weight, lbs.	901.2	908.9	13.34	0.07
Dressing %	63.45	63.69	0.43	0.20
Ribeye Area[3], sq. in.	14.16	14.73	0.25	<0.01
Backfat Thickness[3], in.	0.559	0.527	0.032	0.06
Calculated Yield Grade	3.10	2.93	0.07	<0.01
Gain:Feed	0.162	0.163	0.002	0.26

Figure 1.

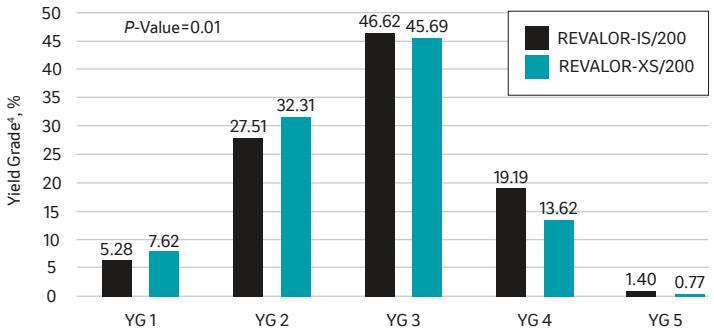
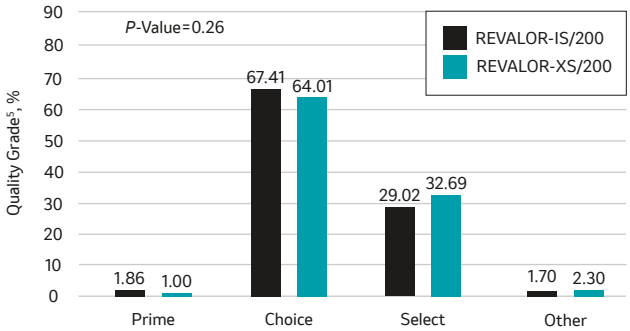


Figure 2.



[1]Treatments: REVALOR®-IS (80 mg TBA, 16 mg E_2) initial implant followed by a REVALOR®-200 (200 mg TBA, 20 mg E_2) terminal implant (IS/200) and REVALOR®-XS (80 mg TBA and 16 mg E_2 uncoated; 120 mg TBA and 24 mg E_2 coated; 200 mg TBA and 40 mg E_2 total) initial implant followed by a REVALOR®-200 terminal implant (XS/200). Average days-on-feed = 210. Average re-implant day = 123 for IS/200 and 131 for XS/200.

[2]SEM: Standard error of the mean.

[3]Provided only for two studies; for these analyses, *n*=1,729 carcasses.

[4]*N*=2,587 carcasses.

[5]*N*=2,595 carcasses.

CONCLUSION

When steers are fed for longer than 200 days and implanted with a terminal REVALOR®-200, a REVALOR®-XS initial implant may provide for greater carcass weight and ribeye area and reduced (improved) yield grade when compared with an initial REVALOR®-IS.

REFERENCES

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BV-51327-204d. 204-day REVALOR®-XS vs. REVALOR®-IS re-implanted with REVALOR®-200 or REVALOR®-S. Merck Animal Health Technical Bulletin.

BV-51327-2-195d. 195-day performance-based initial steer implant followed with REVALOR®-200 as a terminal implant. Merck Animal Health Technical Bulletin.

BV-51327-2-217d. 217-day REVALOR®-IS re-implanted with REVALOR®-200 vs. REVALOR®-XS as an initial implant re-implanted with performance-based REVALOR terminal implants in calf-fed steers. Merck Animal Health Technical Bulletin.

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US/RV/1218/0002. Effect of three initial implant programs with a common terminal REVALOR®-200 on feedlot performance and carcass traits of weaned steers. Merck Animal Health Technical Bulletin.

Revalor®-XS
(trenbolone acetate and estradiol)

REVALOR-XS IMPORTANT SAFETY INFORMATION:

Not to be used in animals intended for subsequent breeding, or in dairy animals. For Animal Treatment Only. Not for Use in Humans. Implant pellets in the ear only. Any other location is in violation of Federal Law. Do not attempt salvage of implanted site for human or animal food. A withdrawal period has not been established for this product in pre-ruminating calves. Do not use in calves to be processed for veal.

REVALOR-200 IMPORTANT SAFETY INFORMATION:

Not to be used in animals intended for subsequent breeding, or in dairy animals. For animal treatment only. Not for use In humans. Implant pellets in the ear only. Any other location is in violation of federal law. Do not attempt salvage of implanted site for human or animal food. A withdrawal period has not been established for this product in preruminating calves. Do not use in calves to be processed for veal.

REVALOR-IS IMPORTANT SAFETY INFORMATION:

Not to be used in animals intended for subsequent breeding, or in dairy animals. For animal treatment only. Not for use in humans. Implant pellets in the ear only. Any other location is in violation of Federal Law. Do not attempt salvage of implanted site for human or animal food.

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