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The Effect of RAL Implants on Lamb Performance

Leon F. Bush and Frank Whetzal

One way to improve rate and efficiency of lamb production is by the use of growth stimulating compounds. Resorcylic Acid Lactone (RAL) is a relatively new growth stimulating compound that has been shown to improve weight gains and feed efficiency of growing and finishing beef cattle. South Dakota researchers have reported 13% faster gains on 9.7% less feed for yearling steers implanted with 36 mg. RAL when compared to control steers. Two trials were conducted to determine if a 12 mg. implant of RAL would be effective in improving performance of young growing lambs.

Procedure

Trial 1

Two hundred ninety-seven lambs from white-faced ewes of mixed breeding were used in this trial. Either black-faced rams (Hampshire or Suffolk) or Columbia rams sired the lambs. At birth part of the ram lambs were treated to produce bilateral cryptorchid ("push-up") and the remaining ram lambs were castrated. Approximately half of the lambs excluding 40 replacement ewe lambs were randomly selected and implanted with 12 mg. RAL. The remaining lambs served as controls. All lambs were fed in a single group during the experiment. Feeding was done twice daily. A mixed ration of 40% alfalfa hay, 40% steam rolled barley and 20% whole oats was fed for the first 31 days. At this time oats was discontinued and a ration of 40% alfalfa hay and 60% steam rolled barley was fed.

The lambs were marketed in two groups. At the first marketing date all lambs that weighed 90 lb. or more were sold and this included about 50% of the lambs. The lighter weight lambs were kept on feed for another 77 days and sold at an average weight of about 110 lb. The replacement ewe lambs were removed from the trial before the second group of lambs were sold.

Each group of lambs was trucked approximately 350 miles to a packing plant where carcass data were obtained.

## Trial 2

The 105 lambs used in this trial were from ewes on a confinement rearing study. White-faced western ewes were mated to either Hampshire or Suffolk rams. These ewes were on three treatments (I) confined to drylot and building with straw bedding, (II) confined to drylot and building with elevated slotted floor, and (III) pastured when pasture was available then confined to drylot and building with straw bedding during the winter. Lambs were born and raised in the building in their respective lots. Lambs were castrated and docked before they were 10 days of age. Creep feeding was started when lambs were about two weeks old. The creep ration - rolled oats, corn, soybean meal and alfalfa hay was gradually switched to a pelleted ration of 70% concentrate and 30% roughage. The pelleted ration was self-fed. Lambs were weaned when approximately 70 days of age. After weaning lambs from each ewe treatment lot were divided into groups by sex and then randomly divided according to body weight into treatment lots (implanted and control). The treated lambs were implanted with 12 mg. of RAL at the base of the ear. Lambs were marketed at about 105 pounds. Carcass data were obtained on all lambs. Pelt weights and pelt pulling scores were also obtained at time of slaughter.

## Results and Discussion

### Trial 1

The performance of lambs and their response to the RAL implants until the first group was sold (74 days) is shown in Table 1. Average daily gain of all lambs was increased by the implants, however improvement in gain made by ewe lambs was rather small. The greatest response to implants was shown by wether lambs which gained about 3.6 lb. more per head than the controls. This is approximately a 12% increase in daily gain. Daily gain for the implanted "pushup" lambs was about 5.3% greater than for those not implanted.

Lambs that were kept on feed for the entire feeding period (151 days) had a lower rate of gain and showed less response to the implants than was shown for the first 74 days of the trial (Table 2). Indications were that the implants had lost their effectiveness before the end of the 151 day feeding period. The lowered daily gains for the longer feeding period may have resulted in part from feeding to heavier weights.

Average gains made by the lambs fed for the entire period were highest for the "pushup" lambs followed by the wethers with the ewe lambs gaining the least. Total gain for lambs fed the entire period amounted to 79 lb. for "pushups", 72 lb. for wethers and 66 lb. for ewe lambs.

Table 1. Response of feedlot lambs to RAL implants (June 10 to August 23 - 74 days)

Treatment	Pushups		Non-pushups (wethermates)		Ewes		Wethers	
	Im- planted	Non-im- planted	Im- planted	Non-im- planted	Im- planted	Non-im- planted	Im- planted	Non-im- planted
No. lambs <sup>a</sup>	25	23	23	21	44	82	31	36
Init. wt.,lb.	50.6	53.6	49.7	49.2	48.0	49.3	54.5	54.6
Final wt.,lb.	94.2	95.0	88.7	84.7	82.4	83.2	95.0	91.3
Av. gain,lb.	43.6	41.4	39.0	35.5	34.4	33.9	40.5	36.7
Av. daily gain,lb.	0.59	0.56	0.53	0.48	0.46	0.46	0.55	0.50

<sup>a</sup>Includes all lambs on feed

Table 2. Response of feedlot lambs to RAL implants (June 10 to November 8 - 151 da.)

Treatment	Pushups		Non-pushups (wethermates)		Ewes		Wethers	
	Im- planted	Non-im- planted	Im- planted	Non-im- planted	Im- planted	Non-im- planted	Im- planted	Non-im- planted
No. lambs <sup>a</sup>	7	7	10	12	23	31	8	11
Init. wt.,lb.	39.3	40.6	42.0	44.5	38.7	43.7	44.0	40.7
Final wt.,lb.	118.9	118.9	114.1	115.5	105.7	109.1	119.4	111.2
Av. gain, lb.	79.6	78.3	72.1	71.0	67.0	65.3	75.4	70.5
Av. daily gain,lb.	0.53	0.52	0.48	0.47	0.44	0.43	0.50	0.47

<sup>a</sup>Includes lambs remaining on trial after first group sold and replacement ewe lambs removed.

Performance of the crossbred and Columbia-sired lambs for the 74 day feeding period is shown in Table 3. The male lambs outgained the ewe lambs by about 5 lb. per head during the period. Both the crossbred male and ewe lambs gained somewhat faster than the Columbia-sired lambs, however, the differences were rather small. The crossbred ewe lambs gained about 2 lb. more per head and the crossbred male lambs about 1.5 lb. more per head than the Columbia-sired ewe and male lambs, respectively.

A high incidence of rectal prolapses occurred during the feeding period with a total of 21 lambs affected. The incidence was higher in the implanted with 16 affected compared to only 5 nonimplanted lambs. Both ewe and wether lambs were affected with deaths of 13 ewe and 8 male lambs. The majority of cases (14) occurred during the last 3 weeks of August when the weather was hot.

The RAL implants appeared to have little effect upon the carcass traits studied (Table 4).

Carcass grades ranged from high good to average choice for the first group of lambs sold. The ewe and wether lamb carcass grades were quite similar while the "pushup" lambs graded about 1/3 grade lower. The conformation score and carcass grades of the crossbreds averaged about 1/3 grade higher than those of the Columbia-sired lambs.

The carcasses of the second group of lambs sold weighed about 10 lb. more per carcass than did those sold earlier. The heavier carcasses graded about 1/3 grade higher than those sold first and ranged from low to high choice grades. The difference in conformation score and carcass grade between the crossbred and Columbia-sired lambs was again about 1/3 of a grade.

Table 3. Feedlot performance of crossbred and Columbia-sired lambs (74 days)

	Crossbred male lambs	Columbia-sired male lambs	Crossbred ewe lambs	Columbia-sired ewe lambs
No. lambs	64	97	66	65
Initial wt., lb.	55.2	50.5	50.1	47.5
Final wt., lb.	94.8	88.7	84.8	80.4
Av. gain, lb.	39.6	38.2	34.7	32.9
Av. daily gain, lb.	0.54	0.52	0.47	0.44

Table 4. Carcass Data Summary

Treatment	Pushups				<u>Crossbred lambs</u>				Wethers				Total or average
	Pushups		Ewes		Ewes		Wethers		Wethers				
	RAL	Cont- rol	RAL	Cont- rol	RAL	Cont- rol	RAL	Cont- rol	RAL	Cont- rol			
Marketed <sup>a</sup>	1	1	2	2	1	1	2	2	1	1	2	2	
No. lambs	6	8	1	2	13	15	13	15	18	14	6	9	120
Carcass wt., lb.	48.3	46.0	33.0	62.5	45.3	43.2	51.3	53.4	47.3	46.2	59.8	58.9	49.2
Conf. score <sup>b</sup>	20.5	19.8	18.0	20.5	21.2	20.5	21.2	22.2	20.7	20.5	21.8	21.8	21.0
Marb. score	4.7	4.6	4.0	5.0	4.8	4.9	4.9	5.1	4.9	4.9	5.2	5.2	4.9
Carcass grade <sup>b</sup>	19.0	18.8	17.0	20.5	19.8	19.9	20.5	21.0	19.7	19.7	21.0	21.2	20.1
<u>Columbia-sired lambs</u>													
No. lambs	9	8	6	5	3	3	11	18	17	20	14	16	130
Carcass wt., lb.	43.0	45.8	59.0	52.2	37.7	42.3	47.6	51.2	42.9	41.4	52.7	50.3	47.3
Conf. score	19.1	18.9	20.3	19.8	19.7	20.0	20.3	20.5	19.4	19.2	20.7	20.2	19.9
Marb. score	4.1	4.6	4.8	4.6	4.3	5.0	4.7	5.0	4.8	4.7	5.0	4.9	4.8
Carcass grade	18.2	18.5	20.0	19.4	18.7	19.7	19.5	20.1	19.0	18.8	20.5	19.9	19.4
<u>Summary for RAL treatments</u>													
No. lambs	15	16	7	7	16	18	24	33	35	34	20	25	250
Av. carcass weight, lb.	45.1	45.9	55.3	55.1	43.9	43.0	49.5	52.2	45.1	43.4	54.8	53.4	48.2
Conf. score	19.7	19.3	20.0	20.0	20.9	20.4	20.8	21.3	20.1	19.8	21.1	20.8	20.4
Marb. score	4.3	4.6	4.7	4.7	4.7	4.9	4.8	5.0	4.9	4.7	5.0	5.0	4.8
Carcass grade	18.5	18.6	19.6	19.7	19.6	19.9	20.0	20.5	19.4	19.2	20.6	20.4	19.7

<sup>a</sup> 1 - indicates lambs sold after 74 days on feed and 2 - those lambs marketed 77 days later.

<sup>b</sup> Grade and conformation scores: 17 = good; 18 = high good; 19 = low choice; 20 = av. choice; 21 = high choice and 22 = low prime.

## Trial 2

Lamb performance and carcass data are shown in table 5. Lambs implanted with 12 mg. RAL did not respond favorably to treatment. Rate of gain was decreased and more feed was required per pound of gain for the implanted lambs than for those not implanted. The ewe lambs from the ewe pasture treatment lot (III) were the only group of lambs which showed an increase in growth rate as a result of RAL implant. However implanted ewe and wether lambs in ewe treatment Lot 1 gained more rapidly for the first 56 days on feed than did the control lambs. At this time the treated lambs weighed 86 lb. and 92 lb. for ewes and wethers, respectively. The control wether lambs gained 0.1 lb. per day faster than treated wethers while there was only 0.02 lb. difference in gain in favor of non-implanted ewe lambs. Implanted lambs consumed less feed per day than controls. Feed efficiency was nearly the same for ewe lambs, however implanted wether lambs required about 0.4 lb. more feed per pound of gain than those not implanted.

RAL implant did not significantly effect the carcass characteristics studies. There were only small differences found in carcass grade, fat thickness and percent loin and leg between the implanted and non-implanted lambs. Average loin eye area was larger for the control lambs, however considerable variation in LEA was observed for all lambs. There was no difference in LEA between ewes and wethers.

The difficulty of pelt pulling was observed and scored. Pelts seemed to pull harder from ewe lambs than from wethers. An increase in difficulty of pulling pelts from implanted ewe lambs was most noticeable.

Lambs fed on slotted floor graded higher and were fatter than those fed on straw bedding. The ewe lambs had more fat thickness than the desirable maximum of 0.3 inch. Feed intake for ewes on slats was greater and they were less efficient than ewes on straw. Wether lambs on slotted floor consumed somewhat less feed and were more efficient than wethers raised on straw bedding. Rate of gain, and feed efficiency were decidedly in favor of wether lambs fed on slotted floor.

Table 5. Response of Lambs Implanted with RAL (Brookings)

Ewe Treatment	Pasture		Straw		Slats		Ave.	
	Ewe	Wether	Ewe	Wether	Ewe	Wether	Ewe	Wether
	<u>Implanted</u>							
No. lambs group	9	10	10	9	7	9	26	28
Initial wt.,lb.	53.9	55.3	54.5	60.0	56.3	58.9	54.9	58.1
Final wt.,lb.	103.6	104.2	110.2	107.0	103.0	108.1	105.6	106.4
Rate of gain/ day	0.48	0.39	0.52	0.48	0.49	0.54	0.49	0.47
Av. days on feed	102.0	103.8	105.0	97.8	96.0	88.4	101.0	96.7
Feed intake/day	3.76	3.44	3.59	3.54	3.92	3.10	3.76	3.36
Feed req./lb. gain	7.83	7.72	6.97	7.37	8.06	5.69	7.62	6.93
No. rectal prolapse	0	0	1.0	0	0	0	1.0	0
Carcass grade	ch	ch	ch+	ch	ch+	ch+	ch+	ch
Fat thickness	0.26	0.23	0.35	0.24	0.36	0.28	0.32	0.25
LEA sq.in.	2.00	1.90	2.26	2.06	1.93	2.16	2.06	2.04
% loin and leg	48.1	47.5	45.8	48.4	46.5	45.8	46.7	46.6
Pelt wt.,lb.	13.8	14.7	12.6	13.0	12.7	13.1	13.0	13.6
Pelt pulling score <sup>1</sup>	3.43	2.75	3.00	2.88	3.43	3.00	3.29	2.88
	<u>Control</u>							
No. lambs/group	11	6	8	11	7	8	26	25
Initial wt.,lb.	56.1	56.0	51.2	55.6	55.9	62.1	54.4	57.9
Final wt.,lb.	104.1	107.0	109.1	106.3	105.3	112.4	106.2	108.6
Rate of gain/ day	0.43	0.55	0.56	0.52	0.54	0.63	0.51	0.57
Av. days on feed	111.0	92.3	99.0	98.2	92.0	79.5	100.7	90.0
Feed intake/ day	3.30	4.23	4.21	3.19	4.26	3.72	3.92	3.71
Feed req./lb. gain	7.62	7.66	7.48	6.18	7.94	5.88	7.68	6.57
No. rectal prolapse	0	1.0	1.0	0	0	1.0	1.0	2.0
Carcass grade	ch	ch	ch+	ch	ch+	ch+	ch+	ch
Fat thickness	0.27	0.31	0.27	0.27	0.38	0.32	0.31	0.30
LEA sq.in.	2.23	2.24	2.31	2.21	2.06	2.20	2.20	2.22
% loin and leg	43.9	46.8	48.1	46.7	47.0	45.9	46.2	46.4
Pelt wt.,lb.	14.5	13.0	14.7	13.5	13.4	12.5	14.2	13.0
Pelt pulling score <sup>1</sup>	2.60	2.67	3.00	2.56	2.75	3.00	2.78	2.74

1 - score from 1 to 5, 5 being the most difficult



Summary

In almost every respect lambs in trial 1 (Newell) and in trial 2 (Brookings) responded conversely to a 12 mg. implant of RAL (resorcyclic acid lactone). Wether lambs in trial 1 gained 12% faster while wether lambs in trial 2 gained about 17% slower than the controls. Ewe lambs were affected to a lesser extent but in the same manner. Daily gain for the implanter "push-up" lambs was about 5.3% greater than those not implanted.

In trial 1, incidence of rectal prolapse was affected by implants (16 vs. 6 cases for implant and control, respectively). A few rectal prolapses were observed in trial 2; however, they were not related to RAL treatment. The implants had little effect on carcass traits studied in this experiment.

Difficulty of pulling pelts was observed and scored in trial 2. Removal of the pelt from implanted lambs was more difficult than for control lambs. The increased difficulty was especially noted in implanted ewe lambs.