EFFECT OF ZERANOL IMPLANTS ON BEEF CALVES

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ABSTRACT

This study examines the effects of preweaning Zeranol implantation on preweaning calf performances. Fifty-five Limousin crossbred calves were used in this experiment. The calves received either zero (control), 1 or 2 Zeranol implants prior to weaning. Calves receiving implants (calves receiving 1 or 2 implants combined) consumed .27 kg more creep feed per head per day than did controls. Calves receiving one implant had 8.64 kg. higher ($P < .05$) adjusted 205 day weights than controls. Weight per day of age (WDA) was nonsignificantly higher for calves receiving 1 implant compared to control. Calves receiving 2 implants had 19.09 kg. higher ($P < .05$) adjusted 205 day weights and .09 kg. higher ($P < .05$) WDA values than controls. Calves receiving one implant netted \$4.47 more at weaning than controls. Calves receiving 2 implants netted \$18.88 more at weaning than controls.

INTRODUCTION

Zeranol, trade name Ralgro, is a derivation of corn mold and acts as a growth promotant in cattle (NRC, 1976). Since Zeranol was approved for use in beef cattle various trials have been conducted to determine the efficacy of this compound for improving weight gains postweaning (Borger, et al., 1973). A review of the literature, however, indicates little research has been conducted regarding the effect of Zeranol preweaning.

The purpose of this trial was to evaluate the effects of Zeranol implants on beef calves prior to weaning. The criteria evaluated included: 1) adjusted 205 day weaning weight, 2) calf weight per day of age, 3) feed consumption of the calves, and 4) a cost of production analysis based on total weight gain and cost of feed.

METHODS

Fifty-five Hereford-Angus cross beef cows and their Limousin cross calves were used in this experiment. Cows and corresponding calves were stratified by calf age to four pens. All calves in two pens received implants containing 36 mg. of Zeranol (3 - 12 mg pellets) at trial initiation. These implants were administered subcutaneously in the left ear. The calves in the other two pens served as controls and did not receive ear implants (Table I). Of the 27 calves receiving ear implants, the 6 oldest calves in each of the two treatment pens received only the initial implant. The remaining calves in the two treatment pens (those less than 81 days of age at trial initiation) received one additional 36 mg. implant on day 84 of the experiment.

All cows and calves were weighed at the beginning and end of the experiment. Cows and calves were held off feed and water overnight (12 hours) before beginning and ending weights were taken. Each cow was weighed when her calf was weaned. Each calf weaning weight corresponded to its final experiment weight. Interim weights were taken every 28 days on the calves. The calves were weaned in two groups to enable a more accurate calculation of adjusted 205 days weights. Actual calf weaning weights were adjusted to a steer equivalent 205 days weight for age of calf, sex of calf and age of dam according to procedures recommended by the Illinois Beef Performance Testing Program (Ricketts and Carr, 1978). Bull calves were neutered at birth by the banding technique.

The trial lasted 158 days and was composed of two periods. Period 1 was composed of the first 118 days of the experiment. Period 1 began on February 19, 1981 and ended on June 11, 1981 when the 6 oldest calves in each pen were weaned. Period 2 was composed of the last 40 days of the experiment. Period 2 began on June 11, 1981 and ended on July 21, 1981 when the remaining calves in each pen were weaned.

The cows' diet consisted of corn silage, corn stalks and whole shelled corn. The corn silage was fed once daily at the rate of 25 pounds per head. The corn stalks were fed ad libitum in big round bales. The whole shelled corn was fed once daily with the corn silage at the rate of 5 pounds per head. The whole shelled corn was fed until day 137 of the experiment which occurred on June 30, 1981.

The calves were fed creep ad libitum (Table II). They were also allowed free choice access to alfalfa hay. All creep and hay feed were weighed. A record of orts was kept throughout the trial. The creep diet was changed on day 40 of the experiment to creep 2.

The effects of implant treatment were confounded with different weaning times and associated seasonal environmental effects on calf performance. Therefore, separate analyses of variance were conducted for data on calves weaned during different periods. Comparisons were only made between implant treatment and control groups weaned within the same period. No statistical comparisons were made between implant treatment and control data for calves weaned during different periods. One-way classification models and appropriate F-tests were used for all comparisons (Steel and Torrie, 1960).

RESULTS AND DISCUSSION

Average age of all calves beginning the test was 73 ± 6.0 days. Average age of the calves receiving implants at trial initiation was 74 ± 5.8 days. Average age of the control calves was 72 ± 6.3 days. Sex of the calves across pens were similar (Table I). The average sex for those calves receiving implants at trial initiation was 1.6 ± .35. The average sex for control calves was 1.6 ± .30.

Since the calves receiving implants and controls were housed in different pens, a comparison of feed intake between the two groups was possible. However, those calves receiving 1 implant or 2 implants were kept in the same pens and individual feeding was not possible. Therefore, no attempt could be made to compare feed consumption within implant treatments. Similarly, it was not possible to compare feed intake between the calves of each implant treatment group and the corresponding control group.

During period 1 the calves receiving 1 or 2 implants consumed an average of 3.14 kg of feed per head per day compared to controls which consumed 2.86 kg of feed per head per day (Table III). This is a difference of .28 kg. During period 2 the calves receiving 2 implants consumed an average of 4.24 kg of feed per head per day compared to 3.73 kg for controls. This is a difference of .41 kg. These consumption figures are reflected over the entire 158 day trial as 3.27 kg of feed per head per day for implant treatment calves (includes calves receiving 1 implant and calves receiving 2 implants) compared to 3.0 kg of feed per head for controls. This is a difference of .27 kg per head per day.

Total feed intake can be broken down into creep consumption and hay consumption. Based on the entire 158 day trial the calves receiving implants consumed 3.05 kg of creep and .22 kg of hay per head per day. Controls consumed 2.68 kg of creep and .32 kg of hay per day. Assuming current feed ingredient cost creep diet 1 would cost 17.6¢ per keg and creep diet 2 would cost 15.8¢ per kg. On this basis the average cost of feed consumed per head per day was 52.4¢ for the calves receiving implants and 46.9¢ per day for controls. Therefore, it cost 5.5¢ more per head per day to feed the calves receiving implants.

An approximate preweaning feeding period of 132 days can be calculated by subtracting the mean calf age at trial initiation of 73 days from the adjusted weaning age of 205 days. By multiplying the 132 day feed period by the difference in cost of feed per day between implant treatment and control of 5.5¢, a difference in total feed cost for the 132 day period can be obtained. This difference in cost of feed is equal to $7.26. At current prices each 36 mg. implant costs $1.00. Therefore, based on these figures it would cost $8.26 more to implant a calf once over a 132 day feeding period. Similarly, it would cost $9.26 more to implant a calf twice over the same 132 day feeding period.

Table IV shows the difference in adjusted 205 day weights and weight per day of age between controls and calves implanted with Zeranol. Both the calves receiving one implant and controls weaned on 6-11 had higher 205 day weights than calves receiving two implants or controls weaned on July 21. This observation is most likely due to the more adverse weather conditions of period 2 which probably reduced calf average daily gain. It should be noted that feed consumption during period 2 was greater than that during period 1, for both the treatment group and control group.

When the calves receiving one implant and the control group weaned on June 11 are compared, the calves implanted with Zeranol out-performed the controls by 3.1%. This 3.1% increase resulted in an 8.64 kg increase ($P \leq .05$) in 205 day weight for the calves receiving one implant. This percentage increase is also reflected in a .04 kg nonsignificant improvement in weight per day of age (WDA) comparing 1.31 vs. 1.27 for the calves receiving one implant vs. the controls, respectively.

Table IV also shows the comparison of calf weight performance between calves receiving two implants and controls weaned on July 21. The calves receiving two implants had 19.09 kg heavier ($P < .05$) 205 day weights and .09 kg heavier ($P < .05$) WDA values than did their controls. These heavier weights resulted in a 7.3% improvement over that of controls.

When data for periods 1 and 2 are averaged, the calves receiving implants out-performed all controls by 5.7%. The calves receiving implants had 15 kg

heavier adjusted 205 day weights and .07 kg heavier WDA figures.

Using current market values, calves weighing 255 kg should bring about $1.47 per kg of body weight. Therefore, according to this study, calves receiving one preweaning Zeranol implant weighed 8.64 kg more at 205 days of age and resulted in a $12.73 higher gross return over that of controls. Using these figures, Table V shows that implanting calves one time resulted in an increased net return of $4.47 per head over that of controls. Implanting calves twice with Zeranol prior to weaning resulted in 19.09 kg heavier 205 day weights which is reflected in a $28.14 higher gross return over that of controls. This higher gross return is reflected in an $18.88 higher net return. On the basis of this one experiment it would seem advantageous to the feeder calf producer to implant his calves with Zeranol prior to weaning. This trial also suggests that it is economically more practical to implant calves twice before weaning.

LITERATURE CITED

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Table I. Experimental Design

Pen number	1	2	3	4		
					mean	S.E.
Zeranol implant	–	+	–	+		
No. of calves starting trial	14	13	14	14		
No. of calves weaned during period 1	6	6	6	6		
No. of calves weaned during period 2	8	7	8	8		
Calf sex*	1.6	1.5	1.5	1.6	1.58	.32
Calf age +	71	76	72	73	73	6.0

*1 equals heifer and 2 equals steer.
+ Calf age at trial initiation is recorded in days.

Table II. Creep Diets of Calves

Item	Percent of Diet	Percent Crude Protein	Percent TDN	cost* per kg
Creep 1				
Oats	57.5	12	75	13.86
Corn	22.5	10	91	13.42
Protein Supplement	20.0	32	85	33.00
Average		15.6	80.6	17.6
Creep 2				
Ground Alfalfa hay	25	14.8	53	6.60
Corn	55	10	91	13.42
Protein Supplement	20	32	85	33.00
Average		15.6	80.3	15.8

*Cost is in cents per kg.

Table III. Calf Feed Consumption*

Implant	+	–
Period 1	3.14	2.86
Period 2	4.14	3.73
Period 1 + 2	3.27	3.0
Cost +	52.4	46.9

*Feed is in kg per head per day.
+ Cost is calculated as cents per head per day.

Table IV. Calf Weight Change kg*

Treatment	205 day weight	205 day weight Increase	WDA	WDA Increase	Percent Improvement in 205 day weight
	1 Implant vs. Control†				
1 implant	268.19[1]	+ 8.64	1.31	+ .04	+ 3.1
control	259.55[1]		1.27		
S.E.	.30		.06		
	2 Implants vs. Control‡				
2 implants	258.18[2]	+ 19.09	1.26[3]	+ .09	+ 7.3
control	239.09[2]		1.17[3]		
S.E.	.51		.09		
	Implant• vs. Control§				
Implant	262.73	+ 15.00	1.28	+ .07	+ 5.7
Control	247.73		1.21		
Mean	255		1.25		

*Means with same superscript differ significantly ($P < .05$).
†Control refers to those calves weaned during Period 1.
‡Control refers to those calves weaned during Period 2.
§Control refers to all calves not receiving an implant.
•Implant refers to all calves receiving either 1 or 2 implants.

Table V. Return Analysis

Treatment	Additional* Gross Return	Additional§ Feed Cost	Implant Cost	Additional Net Return
One implant	$12.73	$7.26	$1.00	$ 4.47
Two implants	28.14	7.26	2.00	18.88

*Comparisons are between calves receiving implants and controls of periods 1 and 2.
§Comparisons are between each implant treatment and its respective control group.