The Effect of Zeranol on Body Weight Gain of Sucklings and Early Weaned Barbary Lambs

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ABSTRACT

Two trials were conducted to investigate the possibility of utilizing Zeranol to improve weight gain of suckling and non-suckling lambs. In trial 1, the initial implantation did not significantly improve weight gain of the suckling lambs. However, re-implantation of Zeranol at 10 weeks of age in trial 2, resulted in a significant ($P < 0.05$) improvement of the weight gain. When early weaning was employed at 10 weeks of age, the weight gain of the lambs was significantly ($P < 0.05$) reduced as compared with the control. But, when Zeranol was re-implanted in the early weaned lambs, the weight gains was not significantly improved. However, when Zeranol was re-implanted in suckling lambs, the weight gain was significantly improved.

INTRODUCTION

The idea of implanting anabolic agents into growing and finishing cattle and lambs is not new. Several reports based on experimental results have been published (1, 2, 5, 7). Zeranol is one of the anabolic agents which has received a great deal of attention in recent years. Reports have indicated that Zeranol increases rate and efficiency of weight gain in yearling lambs (9), suckling calves, (8, 9), and finishing cattle (1, 4, 5, 7). However, no experimental results were available concerning the effect of Zeranol during suckling or early weaning periods of sheep lambs. Therefore, these experiments were designed primarily to investigate the possibility of utilizing this drug to improve weight gain of suckling and early weaned Barbary lambs.

MATERIALS AND METHODS

Trial 1:

Forty, one week old, suckling Barbary lambs were divided equally into two groups. Lambs in the first group (A) were implanted subcutaneously at the base of the ear with

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pellets each containing 12 mg of Zeranol (Ralgro)*. Lambs in the second group (B) were not implanted and served as controls.

Trial 2:

At 10 weeks of age the previously implanted lambs (Group A, Trial 1) were re-implanted with 12 mg of Zeranol and subdivided into two groups (C and D) of 10 lambs each. However, at this age should be no residual effect of Zeranol used in the first implantation period. Since Wilson *et al.* (1972) reported that implanting 12 mg of Zeranol showed no effect on weight gain after 40 days following the day of implantation.

Lambs in the first group (C) were early weaned, whereas lambs in the second group (D) were left to suckle. The non-implanted control lambs (Group B, Trial 1) were also subdivided into two group (E, F) of 9 lambs each. Lambs in group (E) were early weaned, whereas lambs in the other group (F) were left to suckle.

The experimental animals (in Trial 1 and 2) with their mothers were housed in open pens. Mothers were fed commercial concentrates and oat hay. Individual weights of lambs were taken initially and at the end of each week for 6 weeks in Trial 1 and 5 weeks in Trial 2.

Data in Trial 1, and 2 were statistically analyzed by analysis of variance. Differences among means were tested using Duncan's Multiple Range Test (6).

RESULTS AND DISCUSSION

Trial 1:

Data showing the effect of Zeranol on body weight gain of suckling lambs is summarized in Table 1. There was no significant differences between the two groups. The average daily gain for the implanted lambs was improved but not significantly as compared to non-implanted lambs. Thomas *et al.* (1970) reported similar data in suckling calves and indicated no significant effect of Zeranol implants on the weight gain.

Table 1. The effect of Zeranol on early suckling lambs.

Group	Parameters					
	Number of animals	Average birth weight kg	Average initial weight kg	Average final weight kg	Average total [1], gain kg	Average [2] daily gain gm
A (implanted lamb 12 mg Zeranol)	20	4.55 ± 0.47	6.86 ± 0.82	16.49 ± 2.04	9.66 ± 1.82	230
B (non-implanted lamb	18	4.64 ± 0.50	6.56 ± 0.91	15.53 ± 2.42	8.97 ± 1.86	241

[1]Average gain for 6 weeks.
[2]Means are not significantly different ($P < 0.05$).

**Ralgro as a brand name of Zeranol, it is a product of International Minerals and Chemical Corporation, New York.*

Trial 2:

In this trial implanted suckling lambs with Zeranol showed a significant-increase in weight gain compared to lambs in Trial 1 (Table 2). Apparently in Trial 1, the anabolic response to 12 mg of Zeranol was not enough to bring a significant improvement in weight gain.

The average daily gain for the implanted suckling lambs was 193 grams in group (C) as compared to 110, 123 and 124 grams for group D, E, and F respectively, (Table 2).

The main effect of Zeranol on weight gain of lambs is shown in Table 3. The average daily gain of Zeranol implanted lambs was signifivantly ($P < 0.05$) greater than that of the non implanted groups. The differences between the two treatments were 42 grams on an average daily basis.

Sharp and Dyer (5) attributed the increase in body weight to an increase in protein formation in the body tissue along with a decrease in fat. Furthermore, Vander Wal (10) reported that Zeranol improved nitrogen retention in calves. Borger *et al.* (2, 3) found that growth hormone and insulin levels of implanted steers were significantly higher than those of non-implanted animals. It was postulated that the improvement in

Table 2. Effect of Zeranol and suckling on weight gain of lambs.

Groups	Parameters				
	Number of animals	Average initial weight kg	Average final weight kg	Average 1 total gain kg	Average 2 daily gain gm
C *(non-suckling re-implanted)	10	23.77 ± 2.64	28.10 ± 2.82	4.33 ± 1.47	124[a]
D (suckling + re-implanted)	10	22.65 ± 3.57	29.40 ± 5.83	6.75 ± 2.89	193[b]
E *(non-suckling non-implanted)	9	23.77 ± 3.26	27.61 ± 3.26	3.84 ± 2.20	110[a]
F (suckling + non-implanted)	9	21.36 ± 3.14	25.67 ± 3.08	4.31 ± 1.48	123[a]

*Weaned at 10 wks of age.

[1]Average gain for 5 weeks.

[2]Means with different superscripts differ significantly ($P < 0.05$).

Table 3. Main effects of Zeranol implantation on gain of lambs.

Treatment	Parameters				
	Number of animal	Average initial weight kg	Average final weight kg	Average 1 total gain kg	Average 2 daily gain gm
Zeranol					
Re-implanted lambs	20	23.21 ± 3.14	28.75 ± 4.58	5.54 ± 2.29	158[a]
Non-implanted lambs	18	22.57 ± 2.50	26.63 ± 3.17	4.06 ± 1.87	116[b]

[1]Average gain for 5 weeks

[2]Means with different superscripts differe significantly ($P < 0.05$).

nitrogen retention on protein formation is under the synergestic action of insulin and growth hormone (5). In Trial 1 of this study the negative response to Zeranol treatment may be attributed to insufficiency of the dose or inability of Zeranol, to bring about the secretion of growth homone and/or insulin to the levels capable of traggering a significant anabolic response.

The effect of suckling on the weight gain of implanted and nonimplanted suckling lambs is presented in Table 4. The average daily gain for the implanted suckling lambs

Table 4. Main effects of suckling on gain of lambs.

Treatments	Parameters				
	Number of animal	Average initial weight kg	Average final weight kg	Average 1 total gain kg	Average 2 daily gain gm
Non-suckling*	19	23.77 ± 2.20	27.85 ± 3.04	4.08 ± 1.87	117[a]
Suckling	19	22.01 ± 3.36	27.53 ± 4.66	5.52 ± 2.30	158[b]

*Weaned at 10 weeks of age.
[1]Average gain for 5 weeks.
[2]Means with different superscripts in these columns differ significantly ($P < 0.05$)

was 158 grams as compared with suckling non-implanted 117 grams. Significant differences ($P < 0.05$) were found between the two groups in average daily gain.

The weight gain of suckling re-implanted lambs was significantly higher than suckling non-implanted, early-weaned re-implanted (2nd time), and early-weaned non-implanted (Table 2). This increase may be due to the interaction between Zeranol and suckling. Further study needs to be conducted to determine the effect of Zeranol on the performance of barbary lambs.

LITERATURE CITED

1. Borgar, M. L., L. L. Wilson, J. D. Simk, J. H. Ziegler, S. L. Davis, C. F. Orley and M. C. Rugh. 1971. Zeranol and protein effects on finishing steers. J. Animal Sci. 33:275 (Abstract).
2. Borger, M. L., L. L. Wilson, J. D. Sink, J. H. Ziegler and S. L. Davis. 1973. Zeranol and dietry protein level effect on live performance, carcass merit, certain endocrine factors and blood metabolites level of steers. Anim. Sci. 36:706–711.
3. Borger, M. L., L. L. Wilson, J. D. Sink, J. H. Ziegler, and S. L. Davis. 1973. Zeranol and dietary protein level effect on DNA, RNA, and protein composition on three muscles and the relationship to serum insulin and GH levels of steers. Anim. Sci. 36:712–715.
4. Perry, T. W., Martin Stob, D. A. Huber and R. C. Peterson. 1970. Effect of subcutaneous implantation of resorcylic acid lactone on performance of growing and finishing beef cattle. J. Anim. Sci. 31:789, (Abstract).
5. Sharp, G. D. and I. A. Dyer. 1970. Metabolic responses to Zeranol implants. J. Anim. Sci. 30:1040, (Abstract).

6. Thomas, O. O. and J. Armitage. 1970. Zeranol for growing fattening steers. J. Amin. Sci. 30:1039, (Abstract).
7. Thomas, O. O., J. Armitage, and O. Sherwood. 1970. Zeranol and stilbestrol for suckling calves. J. Anim. Sci. 30:1039, (Abstract).
8. Wilson, L. L., M. L. Borger, A. H. Peterson, M. C. Rugh, and C. F. Orley. 1972. Effect of Zeranol, dietry protein level and methionine hydroxy analog on growth and carcass characters and certain blood metabolites in lambs. J. Anim. Sci. 35: 128–131.
9. Vanderwal, E. J. VanWeerden, J. E. Sprietsma, and J. Huisman. 1975. Effect of anabolic agents on nitrogen retention of calves. Anim. Sci. 43:986–992.

تأثير عقار الزرانول على زيادة الحملان الرضع والمفطومة مبكرا

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المستخلص

لقد أجريت تجربتين لمعرفة إمكانية إستخدام عقار الزرانول لزيادة وزن الحملان الرضع والمفطومة مبكرا . لقد أظهرت النتائج بأن الحقنة الأولى للعقار زادت وزن الحملان زيادة طفيفة . إلا أنه عند أعطاء جرعة أخرى من العقار زاد وزن الحملان زيادة جوهورية ذات قيمة إقتصادية إلا أن الفطام المبكر للحملان قلل من معدل زيادة الجسم عند مقارنتها بالحملان الرضع .

إن عقار الزرانول حسن من معدل الزيادة في وزن الحملان المفطومة مبكراً عن تلك التي لم تعامل بالعقار .