

EVALUATION OF DIET AND REMATING INTERVAL AFTER PARTURATION ON THE GROWTH  
OF LITTERS OF DIFFERENT SIZE<sup>1</sup>

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INTRODUCTION

Intensive rabbit production in commercial farms relies in high conception rates and number of parities. The possibility of more litters per year can be achieved if the doe is remated shortly after parturation which implies weaning at four weeks. However this system has been associated to doe mortality, litters of small size or weight at birth and low postnatal growth. Most research has not considered size of litters, although it is strongly related to milk production of does.

Most pelleted feeds used in lactating does contain 16-17% Crude Protein (CP) and about 2.5 Mcal/Kg Digestible Energy (DE) as fed, but rabbit is by nature a herbivore able to digest large quantities of bulky feeds, having the old traditional rations lower nutrient concentration. Lower protein/energy diets, in relation to pup growth and doe's body condition throughout several reproductive cycles under an intensive production system, seem of interest to be evaluated.

The objective of the present experiment was to determine the performance of does remated at three different intervals after parturation and fed four diets varying in their energy:protein ratio, with a high-fibre and low energy content.

MATERIALS AND METHODS

Two hundred and twenty five crossbred does were used throughout the experiment. They were allocated in twelve groups, assigning to each one diet and one remating interval.

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Four diets differing in energy/protein content (CL1,2,3,4) were used, and their composition is shown in Table 1.

Table 1. Chemical composition of diets

	Diet			
	CL1	CL2	CL3	CL4
Dry matter, %	90.6	90.6	90.6	90.3
Ash, %DM	10.6	8.8	10.4	9.9
Crude fiber, %DM	14.7	14.8	18.4	17.7
Acid detergent fiber, %DM	21.1	20.4	27.0	27.1
Crude protein, %DM	19.3	16.3	17.3	15.6
Digestible protein, %DM	14.2	11.0	12.7	10.9
Digestible energy, kcal/gDM	2.6	2.6	2.4	2.4
Energy:protein ratio, kcal ED/g DP	18.0	23.4	18.8	21.7

Diets CL1,2,3 and 4 had final DP concentrations of 14.2, 11.0, 12.7 and 10.9 % DM respectively. Lysine, methionine, arginine, calcium and phosphorus contents according to Lebas,1980. The diets were offered *ad libitum*.

Does were assigned to one of the three treatments defined by their remating interval after parturation: Early (E), Medium (M) and Late (L) corresponding to 1, 9 and 25 days respectively. Weaning age was established for these treatments to be 28, 30 and 42 days.

Number and weight of litters were controlled at birth, 21 days of age and weaning. Litters of 1-4, 5-7 and 8-9 pups were considered separately in the analyses of data.

Data were analyzed following a 4x3 factorial design (Dixon,1985) with diet and remating interval as factors. Means were compared following the test of Scheffe's.

#### RESULTS AND DISCUSSION

Table 2 shows the means of weight in the different reproductive regimes, and the results are grouped into 21 days and weaning performance traits; litter performance was separated for size into 1 to 4, 5 to 7 and 8 to 9 pups. It became apparent that only the largest litters were significantly affected ( $p < 0.05$ ) by remating interval when 21 days of age was considered.

Table 2. Effect of remating interval on litter weight

	Treatment				Sign.
	E	M	L	SE	
Litter weight at 21 days, g					
average	1989	1921	2000	11.11	NS
1-4 rabbits	1422	1303	1371	72.49	NS
5-7 rabbits	2075	2042	2061	49.74	NS
8-9 rabbits	2472 <sub>a</sub>	2436 <sub>ab</sub>	2260 <sub>b</sub>	68.81	*
Litter weight at weaning, g					
average	2767 <sub>a</sub>	3330 <sub>b</sub>	5636 <sub>c</sub>	121.10	**
1-4 rabbits	1834 <sub>a</sub>	1856 <sub>a</sub>	3011 <sub>b</sub>	156.65	**
5-7 rabbits	2907 <sub>a</sub>	3711 <sub>b</sub>	6364 <sub>c</sub>	126.29	**
8-9 rabbits	3640 <sub>a</sub>	4422 <sub>b</sub>	7930 <sub>c</sub>	155.95	**
Mortality, %	26.0	25.5	28.7	1.11	NS

NS = non significant, \* = p<0.05, \*\* = p<0.01

<sub>a, b, c</sub> = means followed by different subscript differ (p<0.05)

Mendez et al, 1986a, with a same schedule, found a significant heavier weight for L litters, although they only compared average figures and no distinction for litter size was made.

Table 3. Effect of diet on litter weight

	Diet				SE	Sign.
	CL1	CL2	CL3	CL4		
Litter weight at 21 days, g						
average	2083 <sub>a</sub>	1832 <sub>b</sub>	2021 <sub>ab</sub>	1942 <sub>ab</sub>	50.4	**
1-4 rabbits	1390	1194	1488	1389	83.7	NS
5-7 rabbits	2207 <sub>a</sub>	1962 <sub>b</sub>	2063 <sub>ab</sub>	2005 <sub>ab</sub>	57.4	*
8-9 rabbits	2473 <sub>ab</sub>	2234 <sub>b</sub>	2542 <sub>a</sub>	2309 <sub>ab</sub>	79.4	*
Litter weight at weaning, g						
average	4158	3668	3905	3412	111.1	NS
1-4 rabbits	2337	2002	2196	2401	182.7	NS
5-7 rabbits	4539	4342	4212	4217	144.3	NS
8-9 rabbits	5519 <sub>abc</sub>	4872 <sub>b</sub>	5878 <sub>c</sub>	5055 <sub>ab</sub>	181.7	**
Mortality, %	24.8 <sub>ab</sub>	36.3 <sub>a</sub>	27.2 <sub>ab</sub>	18.5 <sub>b</sub>	3.4	**

NS = non significant, \* = p<0.05, \*\* = p<0.01

<sub>a, b, c</sub> = means followed by different subscript differ (p<0.05)

The effect of diet on litter weight over lactation is presented in Table 3. Diets 2 and 4, with a lowest protein percentage and higher DE/DP ratio, affected significantly ( $p < 0.05$ ) to litters of more than 4 pups, being  $p < 0.01$  the specific level of significance for diet 2. The same level was found for diet 2 when the largest litters at weaning were compared.

These results suggest a relationship between dietary crude protein and growth of large litters, as previously reported by Ponte et al, 1980 and Partridge and Allan, 1982. Sanchez et al, 1985 suggested that a 14-day rebreeding schedule would be associated to a 19% crude protein over lactation, but Mendez et al, 1986b did not find any significant difference among diets when weight of litters sized 6.4 as a mean, was examined. In the present work, large litters fed on 16% CP diets were lighter and consequently milk production during the first 21 days was only sufficient to feed properly the small litters.

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EVALUATION OF DIET AND REMATING INTERVAL AFTER PARTURATION ON THE GROWTH OF LITTERS OF DIFFERENT SIZE

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SUMMARY

An experiment using 526 litter records from 225 does was carried out to study the effect of diet and remating interval on performance of commercial New Zealand White x California rabbits in a 4 x 3 factorial treatment. Does and litters were fed pelleted diets formulated for either 2.4 and 2.6 Mcal DE/Kg DM, with four energy:protein ratios between 18 and 23.4 Kcal DE/g DP. The does were removed for remating 1, 9 and 25 days after parturation.

Remating interval did not influence neither mortality rate nor average litter weight at 21 days of age, but litters of seven or more rabbits weighted significantly less ( $p < 0.05$ ) for the 25 day treatment.

Diets containing less protein and highest DE/DP ratio tended to give lower weight ( $p < 0.01$ ) in litters sized more than 5 rabbits at 21 days and more than 7 at weaning. These diets were also related to a significant increase in mortality during lactation.

RESUMEN

Se llevó a cabo un experimento utilizando 526 camadas procedentes de 225 conejas, para estudiar el efecto de la ración y ritmo de reproducción sobre el crecimiento hasta el destete de conejos New Zealand White x California en un diseño factorial 4 x 3. Se suministró a conejas y camadas cuatro piensos que contenían 2.4 y 2.6 Mcal ED/Kg MS, con cuatro relaciones diferentes energía:proteína, entre 18 y 23.4 Kcal ED/g PD. El ritmo de reproducción se definió por el intervalo entre parto y monta, que fue establecido en 2, 9 y 25 días.

El ritmo de reproducción no afectó a la mortalidad ni al peso de las camadas a 21 días de edad, pero las camadas de 7 o más conejitos pesaban menos ( $p < 0.05$ ) en el tratamiento de 25 días.

Las raciones con menor contenido en proteína y mayores razón ED/PD dieron lugar a pesos menores ( $p < 0.01$ ) en las camadas de más de 5 gazapos a 21 días y de más de 7 al destete, así como mayores tasas de mortalidad durante la lactación.

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