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FEED INTAKE OF DOES AND THEIR LITTERS IN DIFFERENT ENVIRONMENTAL TEMPERATURES

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SUMMARY

Ninety-five crossbreed New Zealand does were maintained in a traditional rabbitry with daily minimum temperatures ranged from 11 to 28°C or at constant temperature of 30°C, and fed ad libitum on a diet with 11.2 MJ DE/kg DM. Food intake at 12, 18, 24 and 30°C mean minimum temperatures were examined from 279 lactations, using litter size as a covariate. Food intake of does and litters was always lower at 30°C.

In the traditional rabbitry, ingestion of does was similar at all temperatures for the ten last days of gestation and the first week of lactation, but was lower at 24°C for the first three weeks of gestation and second, third, fourth and fifth weeks of lactation. Food intake of litters was lower at 12°C.

Key words: doe rabbit, intake, environmental temperature.

INTRODUCTION

The response to feed intake at ambient temperatures has been usually assessed on a small number of does, parturitions or periods (Rich and Alliston, 1970; Wittorff *et al.*, 1988; Papp *et al.*, 1983; Maertens and De Groote, 1990). Even those works with data from a substantial number of does, have compared a given temperature or a season to the rest of the year, with no further distinction between them (Simplicio *et al.*, 1988; Mendez *et al.*, 1986; Barreto and de Blas, 1993)

Heat stress reduces all parameters of economic importance in rabbit production. With the possible exception of embryo mortality (Wittorff *et al.*, 1988), most of them, and certainly daily weight gain and milk production (i.e. weight of litters) of does are closely related to lower feed intake at high temperature.

The aim of this work was to evaluate the effects of the thermal environment on food intake of does and litters.

MATERIAL AND METHODS

Ninety-five crossbreed New-Zealand nulliparous does were housed in flat-deck cages in a climatic chamber at a constant temperature of 30°C or in a traditional rabbitry, where mean minimum temperatures ranged from 11 to 28°C. Mean minimum temperature recorded for every week of gestation- lactation was assigned to one of these three intervals: 10 to 14 (12), 16 to 20 (18) and 22 to 26 (24). Each week of gestation and lactation

of any reproductive cycle was linked to one of these three groups.

Does were presented to the male at about 4.5 months of age and at no less than 3.2 kg liveweight. Lactating does were presented 14 days after parturition and every 7 days afterwards. Litters were housed in separated cages at 14 days and weaned at 35 days.

A diet with 11.2 MJ digestible energy (DE)/kg dry matter (DM) was offered ad libitum to does and litters. Both food intake and weight of does were recorded weekly, from mating or parturition. Size and weight of litter were also recorded weekly between birth and weaning. Food intake of litters was recorded during the last two weeks of lactation.

Data from 279 complete lactations (40, 100, 49 and 90 respectively for 12, 18, 24 and 30 groups) were analysed using the ANOVA procedure of STATGRAFICS (STSC, 1989) with temperature (12, 18, 24 and 30°C) as the factor and litter size as a covariate.

RESULTS AND DISCUSSION

Ambient temperature had a significant effect on daily feed intake of does and litters. Means and standard errors are given in Table 1.

Feed intake of does was similar for 12 and 18°C groups during gestation and lactation, but decreased in 28°C group, especially during the first 21 days of gestation ($p < 0.0001$) and from 2nd to 5th week of lactation ($p < 0.0001$). A marked depression in intake ($p < 0.0001$) was always found in the group at 30°C (Figure 1).

Maertens and De Groote (1990) reported a significant reduction of 11% in daily feed intake of does in early lactation (6-12 days post-partum) under 21 to 25°C minimum temperature, which are comparable to our figures for the 24 group in the 2nd week of lactation. Wittorff *et al.* (1988) observed a fall of 40-50% at 32°C during weeks 2 and 3 post partum and a smaller effect of temperature on feed intake at pre and postpartum periods. Papp and Rafai (1988) found similar results with pregnant does at 5, 20 and 30°C.

The most complete range of temperatures was examined by Papp and Rafai (1984), recording the intake (g/day) at constant temperature in the 2nd, 3rd and 4th weeks of lactation. Feed intake was similar at 10, 15, 20°C, decreasing 31% at 25°C and 50% at 30°C. In terms of metabolic weight they reported the function: $y \text{ (g/kg}^{0.75}\text{)} = 185.8 - 3.8 t \text{ (}^\circ\text{C)}$ which would give at 18, 24 and 30°C, 105, 85 and 65 g respectively: lower values than these from the present work (121, 107 and 82); perhaps the different response could be partially explained by the apparent lack of a previous adaptation.

Feed intake of suckled rabbits was affected by the extreme temperatures (12 and 30°C groups). The 12°C group had a small decrease in feed intake compared to the 18 and 24°C groups (27.6 vs 31 g MS respectively) possibly because the pups remained in the nest box for a longer period. The 30°C group had a pronounced reduction in feed intake (23g MS), this being similar to the

effect of this environmental temperature on does.

Based on this work, it may be concluded that a constant environmental temperature of 30°C has a significant depressive effect on feed intake of does and suckled rabbits. The variation in day and night temperature could increase the heat tolerance of does, because primary feeding periods are at night. Suckler rabbits can tolerate better high ambient temperature in natural conditions of environment.

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Table 1: Feed intake of does and suckler rabbits (g MS/kg^{0.75}/d)

	p tail	12°C		18°C		24°C		30°C	
		Mean	SE	Mean	SE	Mean	SE	Mean	SE
Pregnant does, 1-21 d	0.0000	75.6 ^a	2.15	73.1 ^a	1.38	61.2 ^b	2.25	46.5 ^c	1.32
	0.0000	46.1 ^a	1.91	51.3 ^a	1.38	49.8 ^a	2.01	36.3 ^b	1.49
Lactating does, 1st week ¹	0.0000	101.8 ^a	2.68	102.5 ^a	1.70	97.7 ^a	2.36	69.9 ^b	1.89
	0.0000	119.4 ^a	2.71	116.8 ^a	2.73	107.4 ^b	2.40	79.8 ^c	1.90
	0.0000	125.8 ^a	2.57	120.8 ^a	1.63	103.7 ^b	2.27	81.4 ^c	1.80
	0.0000	128.5 ^a	2.87	126.2 ^a	1.67	109.3 ^b	2.45	83.7 ^c	1.93
	0.0000	120.2 ^a	3.27	116.9 ^a	1.90	99.0 ^b	2.79	82.2 ^c	2.20
Suckler rabbits, 22-35 d	0.0000	27.6 ^a	0.95	31.1 ^b	0.54	31.0 ^b	0.82	22.8 ^c	0.63

SE standard error of mean; covariate no. of pups: ¹ alive at 21 days, ² at 35 days
^a, ^b, ^c Means in the same row with different superscript differ (p<0.05).

