STUDY OF A TWO-PHASE REARING METHOD FOR GROWING RABBITS

MATICS ZS., SZENDRO ZS., RADNAI I., BIRÓ-NÉMETH E., GYOVAI M., OROVA Z.

University of Kaposvár, Faculty of Animal Science, 7400 Kaposvár,
Guba S. str. 40. Hungary
szendro@mail.atk.u-kaposvar.hu

ABSTRACT

Early weaned young (21 days) were reared either at the usual stocking density (20 rabbits/m^2) or at a double density till 6 weeks and than divided over 2 cages. This so-called two-phase rearing method was justified by the fact that early weaned young like to huddle together in larger groups. In the control group, 2 rabbits were reared in a cage of 250 x 400 mm basic area between 3 and 10 weeks of age (n=116). In the experimental groups, 4 rabbits were placed in these cages till 6 weeks of age and than 2 of them were transferred into another cage (n=116), while the other two rabbits were reared further in their original cage (n=116). Between 3 and 10 weeks of age, very similar performances were recorded: feed consumption (102, 102 and 101 g/day), body weight gain (38.1, 38.5 and 38.6 g/day), feed conversion rate (2.61, 2.66 and 2.62 g/g), body weight at 10 weeks of age (2235, 2269 and 2239 g) and mortality rates (2.6, 4.3 and 6.9%, respectively). On the basis of these results, the two-phase rearing of early weaned rabbits is recommended. The utilisation rate of fattening cages and buildings is more economical while it seems to fit more with animal welfare considerations.

Key words: rabbits, stocking density, two-phase rearing.

INTRODUCTION

Some authors (MAERTENS and DE GROOTE, 1984) recommend the use of a stocking density of 40 kg rabbit liveweight/m^2 for the rearing of kits. According to the index expressed in body weight, the number of rabbits that can be placed on one m^2 depends on whether the rabbits are to be fattened to a higher or a lower finishing weight. This is also confirmed by the results of experiments. When rearing rabbits to 77 days of age (to a body weight of 2.5 kg), MAERTENS and DE GROOTE (1984) found that the optimum stocking density was 15-16 rabbits/m^2. On the other hand, AUBRET and DUPERRAY (1992) reported an optimum cage density of 20 rabbits/m^2 for growing rabbits fattened up to 68 days of age (to a slaughter weight of 2.3 kg). In our earlier experiment (MATICS *et al.*, 2003), it was found that rabbits weaned at 3 weeks of age, when allowed free movement (choice) between cages, preferred to assemble in groups up to 5-6 weeks of age, which resulted in stocking densities exceeding even 50 rabbits/m^2. These results have prompted us to try out a method termed two-phase rearing, which means that in the three weeks following an early weaning rabbits are fattened at twice the recommended stocking density. This method has already been tested earlier (RASHWAN *et al.*, 2004);

however, in that experiment the placement of nipples of automatic waterers was not ideal. This experiment was now repeated with smaller fattening cages.

MATERIAL AND METHODS

Pannon white rabbits were used in the experiment. The animals were kept in a closed building, in two levels of inclined-slope battery cages made of wire mesh and having a basic area of 250 x 400 mm (0.1 m^2). The temperature was 16-17^oC while the lighting period was 16L:8D. One third of the rabbits weaned at 3 weeks of age were fattened in twos up to 10 weeks of age (Group TT, n=116). Between 3 and 6 weeks of age, two thirds of the rabbits were reared in groups of four, then at 6 weeks of age they were divided into two groups. Two rabbits remained in the original cage (Group FTO, n=116), while the other two were transferred into a new cage (Group FTN, n=116). Subsequently all rabbits were reared in twos up to the end of the experiment. The rabbits received a commercial rabbit diet (10.3 MJ DE/kg, c. protein = 16%, c. fibre = 15.5%) *ad libitum*. Drinking water was available from nipple drinkers *ad libitum*.

The body weight of growing rabbits and the feed consumption per cage were measured weekly, and the body weight gain and the feed conversion rate were calculated. The mortality was recorded continuously. The performance data were evaluated by two-sample *t*-test and one-factor analysis of variance, using the SPSS 10.0 programme package. The mortality data of the groups were compared by the chi-squared test.

RESULTS AND DISCUSSION

Body weight, body weight gain

Up to 6 weeks of age, the growing rabbits placed in cages in twos and fours had reached the same body weight and showed the same body weight gain (Table 1). After transferring two rabbits into another cage, the body weight gain of the FTO rabbits remaining in their original place slightly exceeded that of rabbits in the other two groups. The body weight of FTN rabbits placed into a new cage was inferior to that of the other rabbits throughout, and they could not fully catch up with the other rabbits even by 10 weeks of age. However, the differences were not statistically significant in any of the cases.

Feed consumption and feed conversion

Between 3 and 4 weeks of age, the feed consumption of rabbits reared in groups of four animals was slightly lower than that of rabbits in Group TT (Table 2). Between 6 and 7 weeks of age, rabbits in Group FTO ate slightly more than those in the other two groups; however, there was no difference whatsoever between TT and FTN rabbits in feed intake. Rearing rabbits in groups of four after weaning and subsequently the halving of these groups, however, did not exert a statistically significant influence on the feed consumption of rabbits. In the week immediately after weaning, the feed conversion of

Table 1. Effect of rearing method on body weight and weight gain.

Age (weeks)	Experimental groups			S.E.
	TT	FTO	FTN	
	Body weight, g			
3	364	360		3.2
4	525	523		4.6
5	804	804		6.5
6	1108	1101		8.7
7	1433	1451	1408	10.3
8	1724	1747	1703	10.8
9	2013	2041	1999	11.1
10	2235	2269	2239	11.6
	Body weight gain, g/day			
3-4.	23,1	23,3		0,37
4-5	39.9	40.2		0.41
5-6	42.8	42,1		0.55
6-7.	45,9	46,9	45,6	0,46
7-8	41,6	42.4	42.2	0,33
8-9.	41.3	42,0	42,4	0.43
9-10	32.0	32.5	34.3	0.43
3-10	**38.1**	**38.5**	**38.6**	**0.21**

TT: fattened in twos between 3 and 10 weeks of age

FTO: fattened in groups of four rabbits between 3 and 6 weeks of age and in twos between 6 and 10 weeks of age, in their original cage

FTN: fattened in groups of four rabbits between 3 and 6 weeks of age and in twos between 6 and 10 weeks of age, in another cage

rabbits reared in groups of four proved to be significantly better than that of the rabbits kept in twos. These rabbits, huddling together in larger groups, could probably better tolerate the possible stress caused by early weaning. Between 4 and 6 weeks of age the results of the two groups were completely identical. The feed conversion of rabbits transferred to a new cage at 6 weeks of age was slightly better than that of the other two groups. This small difference may have been due to the lower maintenance requirement of Group FTN due to the lower weight of these rabbits. However, the differences were not significant in any of the cases.

Mortality

The mortality rate of rabbits reared in two phases was higher throughout the experiment than that of the growing rabbits reared in twos (Table 3). However, the difference was not statistically significant either in any of the life-stages or during the experiment taken as a whole.

Table 2. Effect of rearing method on feed intake and feed conversion.

Age (weeks)	Experimental groups			S.E.
	TT	FTO	FTN	
	Feed intake, g/day			
3-4	30.2		29.1	5.8
4-5	68.6		68.7	9.3
5-6	96.7		95.1	15.9
6-7	115.2	119.1	116.7	11.1
7-8	134.0	134.8	130.8	10.7
8-9	135.5	138.6	137.0	10.4
9-10	130.5	130.3	131.0	8.3
3-10	**101.5**	**102.3**	**101.2**	**6.7**
	Feed conversion, g/g			
3-4	1.31^{A}		1.25^{B}	0.01
4-5	1.72		1.71	0.01
5-6	2.26		2.26	0.03
6-7	2.51	2.54	2.56	0.03
7-8	3.22	3.18	3.10	0.03
8-9	3.28	3.30	3.23	0.03
9-10	3,98	4,01	3,82	0,04
3-10	**2,61**	**2,66**	**2,62**	**0,03**

$^{A, B}$: different superscripts denote significant differences between the groups ($p<0.05$)
TT, FTO, FTN: see in Table 1.

Table 3. Effect of rearing method on mortality of growing rabbits

Age (weeks)	Experimental groups		
	TT	FTO	FTN
	Mortality, %		
3–6	0.9		2.6
7–10	1.7	1.8	4.4
3–10	**2.6**		**5.6**

TT, FTO, FTN: see in Table 1

Similar results were obtained in another experiment (RASHWAN *et al.*, 2004). Disregarding the initial differences due to the unfavourable position of the nipple drinker, rabbits reared in groups of three throughout and those reared in groups of six up to 6 weeks of age and in groups of three thereafter had the same body weight, body weight gain, feed consumption and feed conversion rate, while the mortality rate was more favourable in the case of two-phase rearing. These data are consistent with the results of the current study and prove that the inter-group differences in mortality rate were indeed incidental.

CONCLUSIONS

Our results have proved that the two-phase rearing of early-weaned rabbits, the doubling of the usual stocking density up to 6 weeks of age and then fattening in the original cage or transfer of the animals into another cage have no adverse effects on the performance of growing rabbits. On the basis of these results, the two-phase rearing of early weaned rabbits is recommended. By two-phase rearing combined with early weaning the utilisation rate of fattening cages and buildings is more economical while it seems to fit more with animal welfare consideration.

ACKNOWLEDGEMENT

The research was supported by the Hungarian Scientific Research Fund (OTKA), project no. TS 044743.

REFERENCES

AUBRET J. M., DUPERRAY J., 1992. Effect of cage density on the performance and health of the growing rabbit. *J. Appl. Rabbit Res.* **15:** 656-660.

MAERTENS L., DE GROOTE G., 1984. Influence of the number of fryer rabbits per cage on their performance. *J. Appl. Rabbit Res.* **7:** 4.

MATICS ZS., SZENDRO ZS., RADNAI I., BIRÓ-NÉMETH E., GYOVAI M., OROVA Z., 2003. Freie Platzwahl der Kaninchen unter verschieden grossen Käfigen. *13. Arbeitstagung über Haltung und Krankheiten der Kaninchen, Pelztiere und Heimtiere. Celle,* 102-108.

RASHWAN A. A., MATICS ZS., SZENDRO ZS., OROVA Z., BIRÓNÉ NÉMETH E., RADNAI I., 2003. Effect of nursing method and stocking density on the performance of early weaned rabbits. 8th World Rabbit Congress, Puebla city, *in press*

SZENDRO ZS., GYARMATI T., MAERTENS L., BIRÓNÉ NÉMETH E., RADNAI I., MILISITS G., MATICS ZS., 2002. Effect of nursing by two does on the performance of suckling and growing rabbits. *Anim. Sci.* **74**. 117-126.