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Performances of weaned rabbits raised in pens or in classical cages: FIRST RESULTS

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Abstract

The performances of 336 weanling rabbits housed in convential cages (4/cage) or in pens were compared, between 29 and 71 days of age, under the same stocking density conditions (15.5/m^2). The 8 pens (30rabbits/pen) of 1.9 m^2 had floor netting and walls of 60-cm height. Daily weight gain (DWG) was significantly higher in the convential cages (+3.3g) than their littermates housed in pens. This effect was mainly pronounced ($P<0.001$) in the first weeks of the growing period. During the entire period also the daily feed intake was lower ($P<0.001$) in pens, and consequently no clear effect on feed efficiency was observed. Mortality was very low and occurred only in the pens (6 of 240 rabbits). Aggressiveness was not observed in the pens, probably related to the possibility of gnawing on the available wooden stick. Walls of 60 cm were not heigh enough to avoid escaping from the pens. The first results of this study show that commercial performances (2.4 kg at 10 weeks with a FE of 3.1) are possible under pen housing conditions, which permit the rabbits to express a normal behaviour pattern as hopping, running or raising.

INTRODUCTION

In commercial rabbitries, meat rabbits are nearly exclusively housed in small collective cages. Group size ranges between 2 ("The Italian system") till 8–10 fatteners depending of the cage system. The surface area of the cage is limited till maximum 0.60 m^2 and the height of the cages is usually only 30 cm. These limited cage dimensions restrict and even avoid normal behaviour pattern as hopping, running or raising. Although only in female adult rabbits deformations of the vertebral column have been observed (Drescher, 1996), recently several efforts have been done to increase the housing conditions of fattening rabbits from a welfare point of view.

Under extensive conditions (5 rabbits/m^2) alternative housing in large pens (up to 70 animals) resulted in comparable growth performance but increased feed conversion ratio (Reiter and Drescher, 1993; Tawfik and Schneider, 1993). However, aggressiveness is a problem and related both to age, sex and group size (Bigler and Oester, 1996).

Under intensive commercial conditions (17 rabbits/m^2), Rommers and Meijerhof (1998) did not observe significant differences in growth, feed intake and mortality between group sizes ranging from 6 till 54 rabbits when rabbits were housed in convential cages. The percentage injured rabbits was not clearly related with group size but increased with age. The experiments in pens (24 rabbits/pen) of Morisse et al. (1999) demonstrated that the floor material largely influences performances and behaviour in the pens. On the other hand, when large pens (4 m^2 indoor + 4 m^2 outdoor) at low density (8 rabbits/m^2) were used, weight gain was altered with 15% at 86

days of age compared to classical cage housing (Van Der Horst et al., 1999).

During the autumn of 1999, one fattening unit of our research facility was renovated and pens for fattening rabbits were constructed. The first results of the fattening performances in these pens, compared with the existing cages in the same experimental house, will be reported.

MATERIALS AND METHODS

Animals

In total 336, twenty-nine days old weanlings of a New Zealand White strain breeded at the Institute (Maertens, 1992) were used. Out of 48 litters, 7 homogeneous young were taken. Five of these young were ad random chosen for pen housing while the remaining 2 were used as controls. Sex of the rabbits was not taken into account. All young were individually ear tagged. The fattening period lasted 6 weeks. Individually weighings were performed every 2 weeks.

Housing

The eight pens of 1.9 m^2 (190 x 100 cm) had a floor netting with a wire thickness of 3.0 mm and a mesh wide of 10.2 x 100 mm. In these pens 30 weanlings were housed or 15.8 rabbits/m^2. The walls consisted of wire netting (4 x 4 cm) with a height of 60 cm. To avoid escaping a small rebord of wire was fixed on the top of the corners. Each pen was equipped with a 90 cm wide feeder (11 feed places), 4 nipple drinkers and a wooden stick of 1 m x 3 cm diameter. Every 2 weeks a new stick was provided.

The classical wire fattening cages measured 60 x 43 cm and were 30 cm high. Four rabbits were housed in these cages (density of 15.4 rabbits/m^2). Each cage was equipped with a nipple drinker and a 12-cm wide outside placed feeder.

The temperature was hold between 15 and 19°C during the fattening trial. Heating and artificial ventilation were used to create optimal environmental conditions. In the windowless experimental house, 10 hours of light was provided per period of 24 hours.

Feeding

Rabbits were fed ad libitum a standard fattening diet according to the most recent recommendations (DE BLAS & WISEMAN, 1998). Crude protein, ADF and ADL were respectively 16.2%, 19.5% and 4.9%. The ME content was calculated to be 9.2 MJ/kg.

Statistical analysis

Analysis of variance was perfomed using a linear model, which included the litter effect and housing. Results in the tables refer to least square means. Mortality rate was compared with a chi-square test.

Results and Discussion

Daily weight gain of rabbits housed in pens was during the whole fattening period lower than

their littermates in classical cages (Table 1). The difference (10-11%) was most pronounced ($P<0.001$) during the first weeks and not more significant between 28 and 42 days after weaning.

Table 1: Daily weight gain of rabbits housed in cages or in pens

	Cages	Pens	SEM	P
N° of rabbits	96	240	-	-
Initial weight, 29d (g)	734	717	4	0.07
Final weight , 71d (g)	2 558	2 409	10.2	<0.001
Covariated final weight[2]	2 539	2 428	5.5	<0.001
Daily weight gain (g)				
0 – 14 d	41.4 *(=100)*	37.0 *(89)*[1]	0.4	<0.001
14 – 28 d	47.4 *(=100)*	42.8 *(90)*	0.4	<0.001
28 – 42 d	41.7 *(=100)*	40.9 *(98)*	0.6	0.54
0 – 42 d	43.5 *(=100)*	40.2 *(92)*	0.2	<0.001
Mortality, 0-42d (%)	0	2.5	-	0.05

[1] As a % of cage housing [2] After covariance analysis with weight at 29d as covariate

Final weight at 71d was influenced by the different initial weight. Therefore, weaning weight used as covariate had a significant ($P<0.01$) effect on final weight. However, the difference in final weight (111g or 4%) in favour of small cage housing was still highly significant.

The data concerning feed intake showed about the same differences and consequently a comparable feed efficiency was determined (Table 2). But this comparison is not correct because a different final weight was obtained. However, final weight as covariate had no significant effect on feed efficiency. The absence of a clear effect on feed efficiency agrees with the results obtained in large cages (Rommers and Meijerhof, 1998).

The difference in daily weight and feed intake were more pronounced in our experiment compared with the investigations of Rommers and Meijerhof (1998). The main differences in housing between these 2 experiments were the density (15.8 vs 17 rabbits/m^2) and the height of the cages (unlimited vs 30 cm). The difference in density is probably not responsible for the different response because overcrowding effects occur only at higher densities (Maertens, 1986, Morisse et Maurice, 1996). Pen housing on the other hand, does much less limit running, hopping and raising that in large cages with a restricting height (30 cm). An increased activity could therefore be responsible for the lower feed intake and consequently lower weight gain. However, behaviour studies have to confirm this explanation.

Mortality during the experiment was very low although no dietary or drinking water treatments were performed except of a dietary coccidiostatic. Mortality occurred only in the pens and was not due to aggressiveness but to pasteurellosis (2 rabbits) and diarrhoea (4 rabbits). The negative effect on mortality ($P<0.05$) has to be confirmed with a larger number of rabbits although an increased infection pressure due to the large group size can not be excluded.

The first days after entering the pens, the young rabbits were very sensitive for visitors, noise or handling and fly together on a heap in a corner of the pen. Furthermore, they tried to escape using all possibilities (nipple tube, climbing). Therefore it could be interesting that they have an area to hide. On the other hand, with increasing age, rabbits became more adapted to the larger locomotion area and less sensitive for external stress.

Rabbits use the wooden sticks to express their gnawing behaviour. After 2 weeks, only small rests remained of the sticks of 1 m and were each time replaced. Probably, the possibility of gnawing helps to avoid aggressiveness.

Our first experience showed that a 60-cm height of the walls is not enough to avoid escaping of the pens. We were obliged to put some wire at the top of the corners. At least a height of 70 or 80 cm seems necessary when the walls of the pens are in wire. Perhaps, when smooth wooden walls are used, escaping is more difficult.

Table 2: Daily feed intake (FI) and feed efficiency (FE) of rabbits housed in cages or in pens

		Cages	Pens	SEM	P
DFI (g)	0-14 d	93.9 *(=100)*	85.8 *(91)*[1]	0.8	0.001
	14-28 d	145.6 *(=100)*	134.6 *(92)*	1.1	0.002
	28-42 d	164.1 (=100)	*154.2 (94)*	1.4	0.01
	0-42 d	134.5 (=100)	*124.9 (93)*	0.7	<0.001
FE	0-14 d	2.28	2.33	0.02	0.2
	14-28 d	3.09	3.15	0.02	0.2
	28-42 d	3.97	3.78	0.03	0.03
	0-42 d	3.10	3.11	0.01	0.6

[1] as a % of cage housing

The first results of this study show, although performances were somewhat altered, that commercial housing of growing rabbits in pens leads to satisfactory performances (2.4 kg at 10 weeks with a FE of 3.1). The 8% slower growth is not dramatic in view of an economic production when we consider that housing costs could be significantly reduced while rabbits are

able to express much better their normal behaviour. In fact, the pens are easily to construct with less material, less feeders and therefore more adapted to an automatic feeding system.

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