GROUPHOUSING OF BROILER RABBITS: PERFORMANCES IN ENRICHED VS BARREN PENS

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ABSTRACT

With the intention to have a distinct difference in stress conditions, broiler rabbits were housed in enriched pens at low stocking density or in barren pens at high density. In total 12 pens of 1.9 x 1.0 m were used for the experiment. Half of them were enriched with a plastic platform (92 x 40 cm), a hiding box (50 x 40 x 35 cm) and gnawing material. In these "welfare friendly" pens, rabbits were stocked at low density (17/pen or 8.95/m²). No enrichment was used in the barren pens and rabbits were stocked at double density (34/pen). Performances of the 306 rabbits were determined bi-weekly between day 29 and slaughter age. During the first 2 weeks, daily feed intake ($P<0.05$) and daily weight gain ($P<0.05$) were higher in the enriched pens: 97.0 and 46.3 g/rabbit and 91.4 and 43.9 g/rabbit, respectively for enriched and barren pens. In the following weeks, performances between enriched and barren pens were comparable. Clear signs of aggressiveness scored as injuries were not observed in any of the pens. Average weight gain during the overall fattening period, was somewhat favourable in the enriched pens (44.6 vs 43.5 g/rabbit/d, not significant).

Key words: rabbits, group housing, fattening, enrichment, performances.

INTRODUCTION

Group housing of social livestock is, in the EC, increasingly considered as an essential development towards sustainable animal farming. Also in growing rabbits efforts are made to develop alternative group housing systems, providing them more available space and as a consequence increased possibilities for movement (PODBERSCEK *et al*. 1991; BIGLER and OESTER, 1996; ROMMERS and MEIJERHOF, 1998; LAMBERTINI *et al*., 2001; DAL BOSCO *et al*., 2002) and/or for cage enrichment (MAERTENS and VAN OECKEL, 2001; LUZI *et al*., 2003).
Different methods exist to assess the effects of housing conditions on animal welfare (CLARK *et al*., 1997). Among them fluctuating asymmetry (FA) is considered as a potential welfare indicator reflecting long-term effects of stressful conditions (MØLLER and SWADDLE, 1997; reviewed by TUYTTENS, 2003). Environmental stressors may

perturb bilateral morphological growth resulting in small, randomly directed deviations from a perfect symmetrical development.
With the intention of having a distinct difference in stress conditions, broiler rabbits were housed in enriched pens at low stocking density or in barren pens at high density. The objective of this experiment is to investigate the effect of these housing conditions on performance and FA of rabbits. Here we present the results of the production parameters. The results on FA will be reported later.

MATERIAL AND METHODS

Weaned rabbits were housed in a single barn containing 12 pens measuring 2.0 (feeder included) x 1.0 m. These pens had floor netting and walls (65 cm height) and no ceiling. Each pen was equipped with a 90 cm x 10 cm feeder (11 feed places) and 4 nipple drinkers. The ventilation and heating system allowed to maintain ambient temperature between 18 and 23°C throughout the experiment. Rabbits were fed *ad libitum* a standard fattening diet. A treatment (2 x 5 days) with Tiamutin® in the drinking water was provided as prevention against enteropathy.
Six pens were enriched with a plastic platform (92 x 40 cm), a hiding box (50 x 40 x 35 cm) and a gnawing stick (Fig. 1). In these "welfare-friendly" pens, rabbits were stocked at low density (17 rabbits/pen or 8.95 rabbits/m²). In the six remaining pens ("barren pens") no enrichment was provided and rabbits were stocked at double density (34 rabbits/pen or 17.90 rabbits/m²).
In total, 306 weanlings of 29 days old were randomly distributed across the 12 pens. Rabbits belong to the final cross of the 2 lines selected at the Institute (MAERTENS, 1992). Litters were distributed homogeneously over the barren and enriched pens. Sex was not taken into account. Weight gain (per individual) and feed intake (per pen) were determined bi-weekly and at age of slaughter (varying between 63 – 72 days to allow sufficient time for doing all the measurements). Signs of aggressiveness were scored as injuries at each weighing.
Out of each pen 7 rabbits were selected at random (but stratified according to sex) for FA measurements. The length and/or width of 11 seemingly bilateral symmetric traits of the intact carcasses and of 50 traits of fleshed (with $NaBO_3.4H_2O$) bones were measured twice on the left and right hand side. Zootechnical traits were subjected to variance analysis using the Proc Mixed procedure of SAS. For animal weights, the models included the random effects of pen and litter.

RESULTS AND DISCUSSION

During the first two weeks, daily feed intake ($P<0.05$) and daily weight gain ($P<0.05$) were higher in the enriched pens (97.0 g and 46.3 g/rabbit) as compared to the barren pens (91.4 g and 43.9 g/rabbit, respectively). In the following weeks, performances of rabbits from enriched versus barren pens were comparable (Table 1).

Table 1. Performances of rabbits in barren *vs* enriched pens

	Weight gain (g/day)				Feed intake (g/day)			
Age (days)	29-43	43-57	57-S	29-S	29-43	43-57	57-S	29-S
Barren pens	43.9 a	48.1	36.3	43.5	91.4 a	142.8	151.7	128.3
Enriched pens	46.3 b	48.3	36.9	44.6	97.0 b	145.0	153.7	131.1

a, b: P<0.05
S = age of slaughter (range: 63 – 72 days of age)

Although the average weight gain during the entire fattening period was somewhat favourable in the enriched pens (44.6 *vs* 43.5 g/rabbit/day) the difference was not significant. Overall, feed conversion ratio was very similar between rabbits from the enriched (2.99) and barren pens (3.00). Mortality was low: 4/102 (enriched pens) *vs* 3/204 (barren pens) and not significant different.

Figure 1. Low-density pen enriched with a plastic platform, a hiding box and a gnawing stick

Clear signs of aggressiveness scored as injuries were not observed in any of the pens. Although the use of the platform and hiding box was not experimentally measured, it was observed that the rabbits made more use of the box shortly after weaning while the platform was visited more in the second part of the fattening period.
A negative impact on the performances of a too high density should be expected at the end of the fattening period (MAERTENS and DE GROOTE, 1984; MORISSE and MAURICE, 1997. The absence of such effect in our experiment could indicate that even at the highest density used (17.9/m²) rabbits didn't show a lack of space. The increased

functional space could be responsible. However, LAMBERTINI *et al*. (2001) obtained significant higher weight gains in pens at densities of 8 rabbits/m² compared to 16/m², but their pens (1 m²) and by consequence the functional space were only the half compared to our pens.

From this pilot study, it can be concluded that rabbits use a platform or a hiding box if available. Providing such enrichment in combination with a low stocking density results in a higher feed intake and weight gain during early fattening. Performance during the mid or late fattening period, however, is not affected significantly.

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