

## THE FREE CHOICE OF RABBITS AMONG IDENTICALLY AND DIFFERENTLY SIZED CAGES

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### ABSTRACT

The aim of this experiment was to obtain information on the free choice of early (at 3 weeks of age) weaned rabbits among different cages, depending on their age. In the first experiment the size of the cages in one cage block with 4 cages was identical (500 x 750 mm), while in the second the cages were differently sized (500 x 300, 500 x 600, 500 x 900 or 500 x 1200 mm). During the first trial 18, 24 or 30 rabbits (12, 16 and 20 rabbits/m<sup>2</sup>) were placed into one cage block; in the second one 8, 16 or 24 rabbits (5.33, 10.66 and 16 rabbits/m<sup>2</sup>) were applied. Rabbits were allowed to move freely among the cages of the block, through swing doors. 24-hour video recordings were taken weekly; the number of rabbits in the different cages was counted once every half hour. The mean of the 48 daily counts was handled as the result for the presence of rabbits in the different cages. In the first experiment, one week after the weaning some 68-77% of all rabbits were counted in a flock in one preferred cage (33-61 rabbits/m<sup>2</sup>); in the less preferred cages only 1-3% of the rabbits were counted. During the second week, the difference was still large between the most highly (32-46%) and the less preferred (9-17%) cages, but rabbits crowded in an other cage. According to the progress of the age (at the age of 9.5 weeks) the proportion of the rabbits in the largest group decreased to 37, 35 and 32% (18, 22 and 26 rabbits/m<sup>2</sup>) and the number of animals in the smallest group increased to 12, 15 and 18%, according to the setting of 18, 24 or 30 rabbits in one cage block. The difference between the most and least preferred cages showed a continuously decreasing tendency; the cage choice tended to be equalized, although the difference was significant in the whole trial period. In the second trial most of the rabbits huddled in one of the two smallest cages, where the density was found to be 18, 70 and 40 rabbits/m<sup>2</sup> (8, 16 or 24 rabbits in one block). In the two larger cages the rabbit density ranged between 1 and 14 kits/m<sup>2</sup>. This difference decreased up to the 2<sup>nd</sup> and 3<sup>rd</sup> weeks, though the number of rabbits was still significantly higher in the smallest cage. At the age of 6.5 weeks the difference in the cage choice tended to equalize, though the difference was significant in the whole trial period. The results prove that early weaned rabbits like to huddle together; this means that more (up to twice) than the conventional number (16 rabbits/m<sup>2</sup>) of rabbits can be fattened in one cage in younger age. It was also found that rabbits prefer to be in one smaller cage instead of a large one.

**Key words:** rabbits, behaviour, free choice, stocking density.

## INTRODUCTION

The effects of stocking density on the production have been investigated in numerous experiments (HAMILTON and LUKEFAHR, 1993; XICCATO *et al.*, 1999). It can be generally concluded that the maximal stocking density depends on the end fattening weight. When rabbits were slaughtered at 2.5 kg, 16 rabbits/m<sup>2</sup> (MAERTENS and DE GROOTE, 1984), when they were fattened to 2.3 kg, 18-20 rabbits/m<sup>2</sup> could be reached (AUBRET and DUPERRAY, 1992). The stocking density generally recommended is 40 kg/m<sup>2</sup> (MAERTENS and DE GROOTE, 1984). In these experiments, however, rabbits had no free choice; their production was investigated in the given cage, at a given stocking density. In our experiment the place choice was investigated with the application of free choice between cages, depending on the age.

## MATERIALS AND METHODS

The experiment was carried out at the University of Kaposvár, on Pannon White rabbits. Rabbits were weaned at the age of 3 weeks. There were four cages in one block (made of wire net), and rabbits were allowed to move between the cages freely, through swing doors. In the first experiment the size of the cages in one cage block was identical (500 x 750 mm). In every cage there were 2 nipple drinkers and one feeder (300 mm length). 18, 24 or 30 rabbits were placed into one block, the stocking density was accordingly 12, 16 and 20 rabbits/m<sup>2</sup>.

The size of the 4 cages was different in the second experiment. The basic cage size (the smallest) was 300 x 500 mm; the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> cages were 2, 3 and 4 times larger (600 x 500 mm, 900 x 500 mm and 1200 x 500 mm, respectively). According to the increasing cage size 1, 2, 3 or 4 nipple drinkers and 100, 200, 300 and 400 mm feeder length was provided. 8, 16 or 24 rabbits were placed into one block; the stocking density was 5.33, 10.66 and 16 rabbits/m<sup>2</sup>. The identically sized cages were marked according to the rabbits number counted in the first week. The highest rabbit number was in group A, then in B and C, while the least were found in group D. The comparison was also performed also on the basis of the weekly rabbit number for the cages (E, F, G, H).

The daily lighting period was 16 hours in both experiments. The temperature during the first experiment was 18-20°C, while it reached 25-28°C in the second (in the summer). Feed (10.3MJ DE/kg, 16% crude protein, 15.5% crude fiber) and water was offered *ad libitum*.

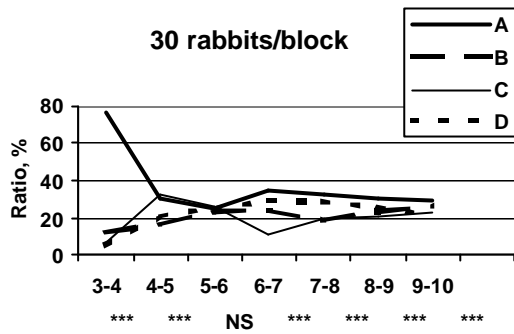
A 24-hour video recording was taken once a week, and the number of rabbits in the cages was counted every half hour. This counting was performed 48 times a day. Feed consumption was measured on the day of the video recording and also weekly.

In the first experiment the number of rabbits in the different cages, while in the second one the number of rabbits on 1 m<sup>2</sup> was compared. Experimental data were evaluated using the SPSS 10 program package. One way ANOVA was used for the analysis.

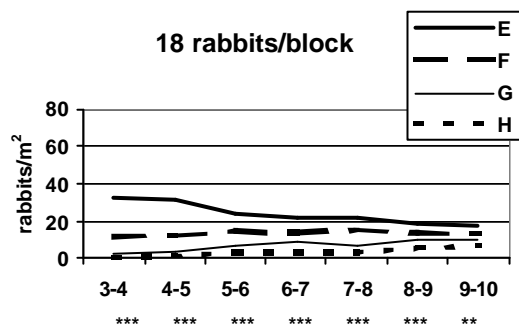
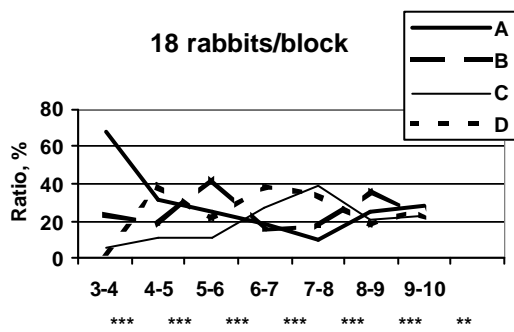
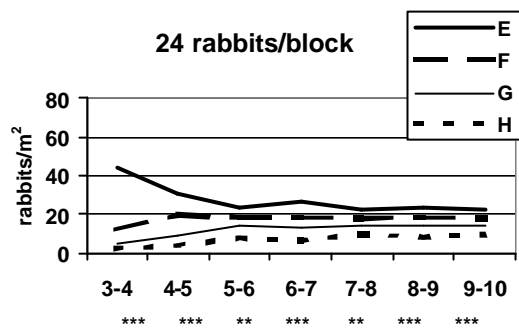
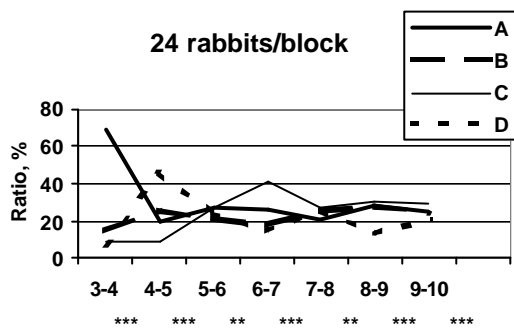
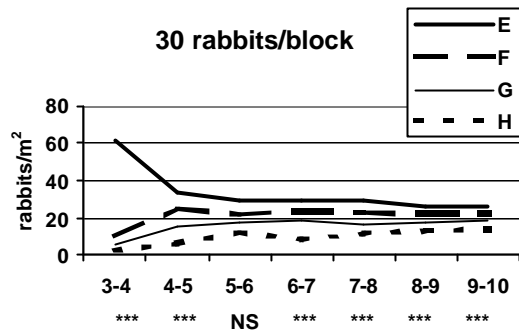
## RESULTS AND DISCUSSION

First experiment (Fig. 1.)

**On the basis of the choice at the 1<sup>st</sup> week**



**According to the choice on the actual week**



Age (weeks)

A: the most preferred cage on week 1;  
 B: the 2<sup>nd</sup> preferred cage;  
 C: the 3<sup>rd</sup> preferred cage;  
 D: the least preferred cage on week 1;

Age (weeks)

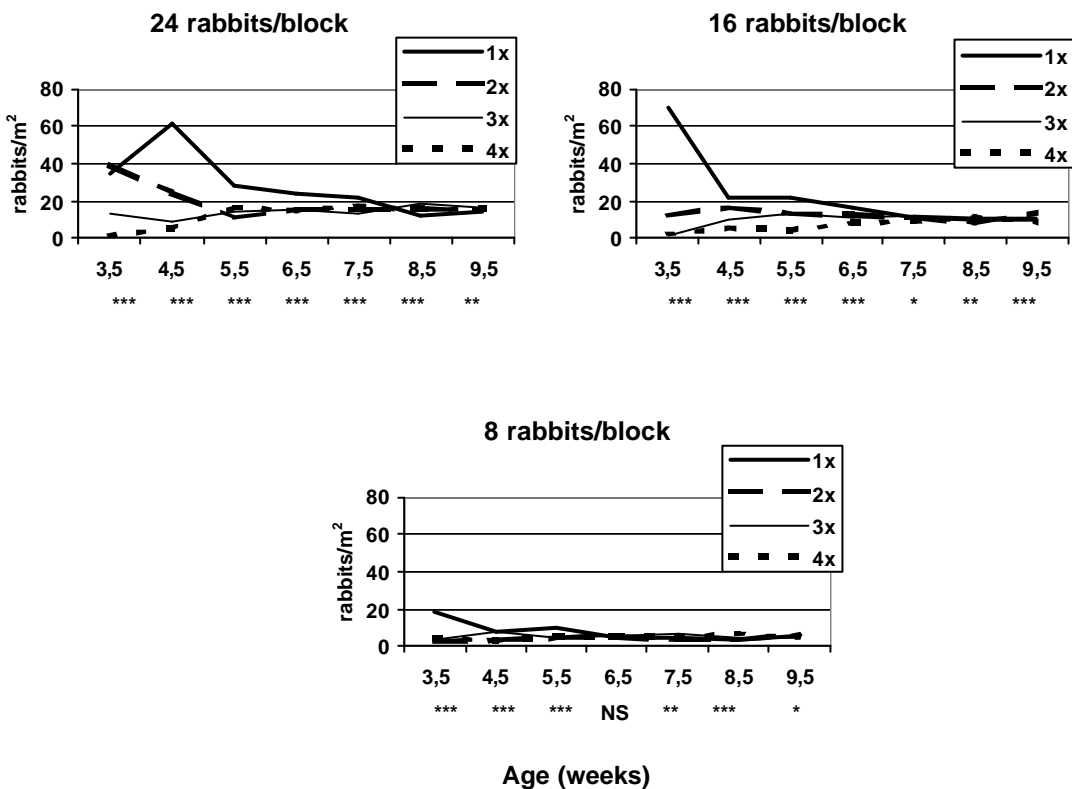
E: the most preferred cage at the actual week;  
 F: the 2<sup>nd</sup> preferred cage;  
 G: the 3<sup>rd</sup> preferred cage;  
 H: the least preferred cage at the actual week.

**Figure 1. The number of rabbits/cage (%) and the stocking density (rabbits/m<sup>2</sup>) in four, identically sized cages, by free choice.**

One week after the weaning (at 3 weeks of age) some 68-77% of all rabbits were counted in a flock in one cage (33-61 rabbits/m<sup>2</sup>). On the 2<sup>nd</sup> week, depending on the number of rabbits in one block (30, 24 and 18), 32, 46 and 39% were found in one cage (31-34 rabbits/m<sup>2</sup>), though the largest number of rabbits was not found in the cage preferred on the 1<sup>st</sup> week. The next some weeks also revealed significant differences in the cage choice, but by 30 rabbits the number of rabbits being actually in the most preferred cage decreased from 29 to 26 rabbits/m<sup>2</sup>. By 24 rabbits this value decreased from 24 to 22, by 18 rabbits from 24 to 18 rabbits/m<sup>2</sup>.

At the same time, the proportion in the least preferred cage increased from the initial value (at the 1<sup>st</sup> week) of 1-3% to 18, 15 and 12% (by 30, 24 and 18 rabbits). Although the difference between the largest and smallest group size tended to decrease continuously, the differences of 14, 20 and 25% (in the cage blocks of 30, 24 and 18) were still significant also on the last week. In the feed consumption similar differences were found between the groups, proving that those were not only valid for the actual day, but for the total trial period.

Second experiment (Fig. 2.)



1x: 300 x 500 mm cage area; 2x: 600 x 500 mm cage area; 3x: 900 x 500 mm cage area; 4x: 1200 x 500 mm cage area

**Figure 2. Changes of the stocking density (rabbits/m<sup>2</sup>) per cage by free choice among four, differently sized cages.**

In the free choice between differently sized cages also strong differences were found. Rabbits tended to huddle in a smaller cage during the first post-weaning week. This led to stocking density values of 18, 70 or 40 rabbits/m<sup>2</sup> by 8, 16 and 24 rabbits in one block, respectively. During the first week the rabbit density in the two largest cages ranged between 1 and 14 rabbits/m<sup>2</sup>. The difference between the groups decreased measurably during the next weeks, though, depending on the number of rabbits in one block (8, 16, 24) the preference of one of the smallest cages and the rejection of the largest one was characteristic. The preferred choice of the smallest cage was not influenced by the condition that the feeder was the smallest here and only one nipple drinker was provided. After the age of 5.5 – 7.5 weeks there was no serious difference in the cage choice.

Similar results were found when 8 or 16 rabbits were examined under similar conditions (MATICS *et al.*, 2002). In that case the stocking density was above 50 kits/m<sup>2</sup> in one of the smallest cages.

### CONCLUSION

Results clearly suggest that early weaned (at the age of 3 weeks) rabbits tend to huddle together in one cage; if it is possible they still choose a small cage even in case of stocking density values of 60-70 rabbits/m<sup>2</sup>. It was observed that rabbits chose this small cage even if it is so crowded that the entry through the swing door is nearly impossible. With the application of differently sized cages the stocking density differences between the cages were more quickly diminished once the smaller cages were filled. In the current experiment the equalization was measurable after the age of 6.5 weeks. Results found in the feed consumption and the unpublished circadian rhythm results prove that the cage choice is independent of the daytime (i.e. from the condition that rabbits are rest or active).

According to the present results it could be advantageous for early weaned rabbits to keep them at higher stocking densities than the conventional (16 rabbits/m<sup>2</sup>). Rabbits prefer a smaller cage at young age.

### ACKNOWLEDGEMENT

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