

THE USAGE OF MULTILEVEL PLATFORMS IN GROWING RABBITS HOUSED IN LARGE PENS AS AFFECTED BY PLATFORM MATERIAL (WIRE-MESH VS PLASTIC-MESH)

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ABSTRACT

The aim of the experiment was to compare the usage of platforms by growing rabbits depending on the platform material (wire-mesh or plastic-mesh). They were housed in pens with two-level platforms. A total of 116 rabbits of both sexes, weaned at 5 weeks of age were studied. They were randomly divided into two groups ($n=58$ rabbits/group, 2 pens/treatment, 29 rabbits/pen). The pens (1.0 x 1.83 m, with wire-mesh floor) were equipped with wire-mesh (WP) or plastic-mesh elevated platforms (PP) in two levels. Evaluating the 24-hour video recordings, the animal density (rabbits/m² in each location) was higher on the floor than on the platforms (in WP: 12.0 vs. 5.2, in PP: 10.2 vs. 7.4 rabbits/m², respectively; $P < 0.001$). The animal density on the floor was higher in front of the platforms than under the platforms (in WP 15.7 vs. 9.8 rabbits/m² and in PP 13.3 vs. 8.3 rabbits/m², respectively; $P < 0.001$). The rabbits preferred staying on plastic-mesh platforms more frequently than on wire-mesh platforms; the animal density on platforms was 1.4 times higher in groups of PP than in WP. The animal density was 1.6 and 2.9 times higher on the second floor than on the first one, in group of PP and WP, respectively. It can be concluded that the floor was more preferred place by the rabbits than the platforms independently the material of platform. The plastic-mesh platform was used more frequently by the growing rabbits than the wire-mesh one.

Key words: Growing rabbit, pen, material of platform, welfare, platform preference.

INTRODUCTION

Nowadays one of the most important aims of the animal breeding is to harmonize production and the animal welfare viewpoints. It is not too easily because in case of rabbit breeding sometimes there are conflicts between people's expectations and the needs of rabbits. On the other hand, according to the recommendations of the European Food and Safety Authority (EFSA, 2005) the benefits of group housing (>3 rabbits/cage) have been emphasised, as in this way rabbits behavioural species-specific behavioural patterns can be easily expressed. One way to increase group size on the same floor size and maintaining low stocking density is by installing elevated platforms. The usage of elevated platforms was also recommended to provide environmental enrichment (de Jong *et al.*, 2011). Elevated platforms are still a new element under investigations and more should be specified about their technical characteristics (size, height from the floor, number of levels, material). Until now, only a few

papers have been published comparing different platform materials on productive performance and behaviour of growing rabbits (Szendrő *et al.*, 2012; Lang and Hoy, 2011; Matics *et al.*, 2014a). Most of the researches has been focused only on the floor material of the cages, comparing wire-mesh, plastic-mesh, steel-slat and plastic-slat floors (Trocino *et al.*, 2008; Princz *et al.*, 2009). The main conclusion of these studies was that wire-mesh floor promotes better hygienic conditions for growing rabbits (reduced risk of infection); whereas, plastic-mesh floor was found to be more preferable (EFSA, 2005). In this experiment the usage of platforms by the growing rabbits were examined depending on the material of platforms (wire-mesh or plastic-mesh elevated platforms) in pens with two-level platforms.

MATERIALS AND METHODS

The study was approved by the Ethical Committee of Kaposvár University. All animals were handled according to the principles stated in the EC Directive 86/609/EEC regarding the protection of animals used for experimental and other scientific purposes.

Animals and experimental design

The experiment was conducted at the rabbit farm of Kaposvár University using the maternal line (Pannon Ka) growing rabbits of the Pannon Breeding Program (Matics *et al.*, 2014b). The rabbits were housed in a room with temperature ranging between 15 and 18 °C, humidity between 65-70%, and the lighting period was 16L:8D (light: 6:00-22:00). The rabbits were fed *ad libitum* with commercial pelleted diets, and water was available from nipple drinkers (5 drinkers/pen).

A total of 116 rabbits of both sexes (1:1) were weaned at 5 weeks of age. They were randomly divided into two groups (58 rabbits/group) and distributed into four pens (1.0 x 1.83 m) with wire-mesh floor and walls (29 rabbits/pen, 2 pens/treatment). The hole size and thickness of wire-mesh floor were 10.7 x 49.6 mm and 2.5 mm, respectively. The pens differed only by the material of platforms:

- **Pens with wire-mesh platforms (WP, Figure 1)** were equipped with seven elevated platforms which were placed on two levels: three platforms on the first level (one of 0.35 m² and two of 0.165 m² surface area) inserted 25 cm above the floor, and four platforms on the second level (each 0.165 m²) placed 50 cm above the floor. The total area of platforms was 1.34 m², the floor area under the platforms was 1.15 m², and in front of the platform it was 0.68 m². Stocking density was 16 rabbits/m² (calculated on the floor area) and 9.14 rabbits/m² (when the areas of platforms were included). The platforms were made of wire-mesh (wire: 2.05 mm thick, hole size: 10.9 x 23.5 mm).
- **Pens with plastic-mesh platforms (PP, Figure 1).** The number, size and position of plastic-mesh platforms was similar as platforms in the WP pens (wire: 4.5 mm thick, diagonal hole size: 14.5 x 23 mm). The stocking density was also similar to WP pens.

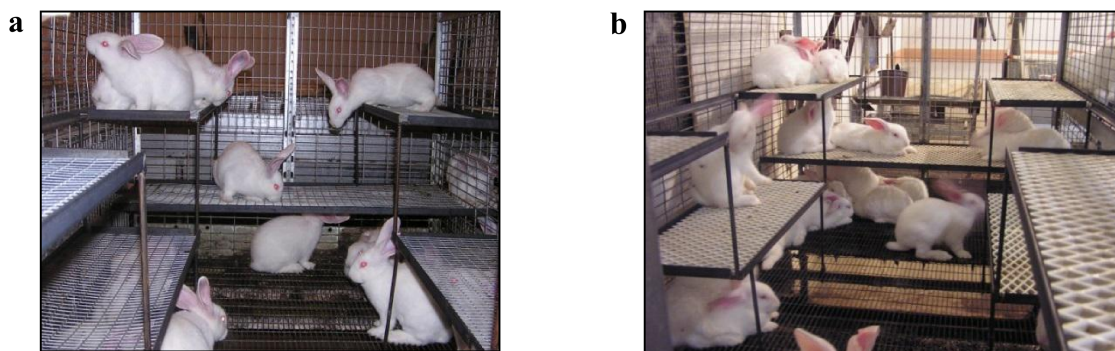


Figure 1: Pen with wire-mesh platforms (a) and pen with plastic-mesh platforms (b)

Evaluation the usage of platforms

24-h video recordings in the pens equipped with platforms (PP and WP) took place once a week. The recording was achieved by using infrared cameras (KPC-S50 NV, B/W CCD) and specialized software (GeoVision GV-800 System, Multicam Surveillance System 6.1.). Number of rabbits was counted every half an hour (48 observations /week /repetition) in the different locations of the pens: on the floor (in front of the platforms and under the platforms) and on the platforms (on the first and on the second level). Since the area of the different parts of the pen were different, the number of rabbits in each location could be dependent on its size. That is why the comparison of preference of rabbits was based on the animal density (rabbits/m²).

Statistical analysis

Location preference among the parts of the pens (in front of the platforms, under the platforms, on the first or second level of the platform, and on the floor or on the platforms) within or between the pens were evaluated by multi-factor ANOVA (Location: fix factor; Repetition: random factor). All data were evaluated with SPSS 10.0 software package.

RESULTS AND DISCUSSION

The results of platform's using are shown in Table 1.

Table 1: Usage of platforms by growing rabbits (in rabbits/m²) depending on the material of platform (wire-mesh or plastic-mesh)

Age, week	Parts of the pens				SE	P-value	Parts of the pens		P-value
	On the floor		On the platform				Together		
	In front of the platforms	Under the platforms	First level	Second level			On the bottom	On the platforms	
Wire-mesh platforms									
5-6	18.5 ^D	8.9 ^{***C}	3.5 ^{***A}	5.9 ^{***B}	0.27	<0.001	12.4 ^{***}	4.7 ^{***}	<0.001
6-7	16.9 ^D	10.1 ^C	2.4 ^{***A}	6.5 ^{***B}	0.22	<0.001	12.6 ^{***}	4.4 ^{***}	<0.001
7-8	15.3 ^C	9.8 ^{***B}	2.5 ^{***A}	8.6 ^{***B}	0.21	<0.001	11.8 ^{***}	5.5 ^{***}	<0.001
8-9	14.6 ^{***D}	10.7 ^C	2.4 ^{***A}	7.9 ^B	0.17	<0.001	12.1 ^{***}	5.1 ^{***}	<0.001
9-10	15.5 ^{***D}	10.0 ^{**C}	2.5 ^{***A}	8.0 ^B	0.16	<0.001	12.0 ^{***}	5.2 ^{***}	<0.001
10-11	13.3 ^{**C}	9.7 ^{*B}	3.2 ^{***A}	10.0 ^{**B}	0.16	<0.001	11.1 ^{***}	6.5 ^{***}	<0.001
5-11	15.7 ^{***D}	9.8 ^{***C}	2.7 ^{***A}	7.8 ^{**B}	0.14	<0.001	12.0 ^{***}	5.2 ^{***}	<0.001
Plastic-mesh platforms									
5-6	16.2 ^C	5.3 ^A	5.9 ^A	12.0 ^B	0.28	<0.001	9.3	8.9	0.474
6-7	14.9 ^C	9.2 ^B	4.3 ^A	8.2 ^B	0.22	<0.001	11.3	6.2	<0.001
7-8	13.2 ^D	7.9 ^B	5.8 ^A	10.5 ^C	0.23	<0.001	9.9	8.1	<0.001
8-9	11.4 ^D	10.0 ^C	5.6 ^A	7.6 ^B	0.17	<0.001	10.5	6.6	<0.001
9-10	12.4 ^C	8.8 ^B	6.5 ^A	7.5 ^A	0.17	<0.001	10.2	7.0	<0.001
10-11	11.5 ^C	8.8 ^B	6.5 ^A	8.6 ^B	0.17	<0.001	9.8	7.5	<0.001
5-11	13.3 ^C	8.3 ^B	5.8 ^A	9.1 ^B	0.15	<0.001	10.2	7.4	<0.001

*, **, ***: There are significant differences (in $P < 0.05$, $P < 0.01$ and $P < 0.001$ level, respectively) between the platform materials within the same age of rabbits.

^{A,B,C,D}: different superscripts within a row show significant differences ($P < 0.05$).

The repetition had no significant effect on the usage of platforms by the growing rabbits.

During the whole experimental period, and irrespectively of the material of platforms, rabbits preferred staying more frequently on the floor than on the platforms. The animal density was 2.3 and 1.4 times higher on the floor than on the platforms in WP and PP pens, respectively ($P < 0.001$).

Examining only the floor, the animal density in front of the platforms was 1.6 times higher than under the platforms ($P < 0.001$) both in WP and PP pens. However, with increasing age rabbits chose more frequently the less preferred areas, and the animal density decreased in front of the platforms in both types of pen. The animal density on plastic-mesh platform was 1.4 times higher than that on wire-mesh ($P < 0.001$). A clear preference was observed for the second (higher) level of platforms compared to the first one, and the animal density was 2.9 and 1.6 times higher on the second level than on the first level in WP and PP pens, respectively ($P < 0.001$).

The platforms increased the moving possibility and enriched the environment for growing rabbits; however they preferred staying more frequently on the floor. This could be explained by the fact that European wild rabbits during the active period of the day live on the earth, like staying under scrubs (protected area), and they move into the warren during daytime, the resting period of day (Kolb, 1986). Jumping up a higher place is not part of the behaviour of wild rabbits, except in the case of escaping predators. According to our previous experiment, rabbits like staying at a place covered by solid platform (Szendrő *et al.*, 2012), which is similar to a protected area for them as the warren or vegetation (e.g. scrubs) for the European wild rabbits protected against predators (Lombardini *et al.*, 2003, 2007; Palomeras, 2003; Beja *et al.*, 2007). Princz *et al.* (2008b) also observed that growing rabbits preferred staying more frequently in the parts of a cage-block with top than in the open-top cage. In contrast with these, in the present experiment the rabbits stayed under the platforms less often, because the rabbits on the platforms may urinate on the pen-mates underneath them. This statement was proven, when preference of rabbits was observed in pens with wire-mesh platform, more rabbits stayed under it when a manure tray was insert under the platform than in pens without manure tray (because of urination; Szendrő *et al.*, 2012).

CONCLUSIONS

The pens with platforms, provides greater possibilities for movement, which is beneficial from the welfare point of view. In spite of this in our experiment the floor was more preferred place by the rabbits than the platforms. The plastic-mesh platform was used more frequently by the growing rabbits than the wire-mesh one.

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