

## LOCATION PREFERENCE OF LACTATING RABBIT DOES AND THEIR KITS IN PENS WITH ELEVATED PLATFORM

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### ABSTRACT

In this study, the location preferences of rabbit does and their kits were analyzed in two types of pens with elevated platforms (wire-mesh or plastic-mesh). The experiment was conducted at the Kaposvár University. Crossbred rabbit does (n=31) were randomly allocated into two groups. PP: pen with plastic-mesh platform (102.5 x 52.5 x 97 cm), the pen floor was wire-mesh, which size of 41.5 x 52.5 cm, and it was disposed at the 25 cm from the base (n=15). PW: pen with wire-mesh platform (102.5 x 38 x 61 cm), the pen floor was wire-mesh, which size of 28.5 x 38 cm, and it was disposed at 26.5 cm from the base. A plastic footrest (40 x 25 cm) was on the lower level (n=16). The lighting schedule was 16 hours light (06:00-22:00) and 8 hours dark (22:00-06:00). Locations of does and their kits were observed with infrared cameras. 24-hour video recordings were performed. The location of rabbit does and kits were registered at every 30 min from kindling till weaning, twice a week on the same days. In PP pens, during the active period (23:00-4:30), the does spent more time on the platform than during the light (resting) period (6:00-17:00). Opposite tendencies were observed under the platform, the preferences of this part of pens were 2.5-3.5 times higher between 5:00 and 17:00 hours than during the dark period (23:00-5:00). The effect of the parts of the day was smaller in the PW pens. On average the does spent by 25.2% more time on the platform when they were placed to PP pens compared to the PW pens. After the kits left the nest boxes the does chose the platform more frequently, then after day 21, when the kits started to visit the platform, the does' platform preference decreased. Usage of the wire-mesh platform by kits was significantly lower than that of the plastic platform. From the aspect of animal welfare cages/pens enriched with platforms can be considered advantageous especially when the platform is made from plastic-mash.

**Key words:** Rabbit does, kits, housing, elevated platform, behaviour, welfare.

### INTRODUCTION

Increasing the size of breeding cages horizontally or vertically (using of an elevated platform) could offer a more comfortable housing and more possibility for locomotion for rabbit does (EFSA, 2005). In cages equipped with platforms the does have the possibility to escape from the kits after leaving the nest box to suckle. In the experiment of Rommers and Meijerhof (1998) and Mirabito *et al.* (1999, 2005) the production of the does was not improved significantly in larger cages or cages with platforms. According to Barge *et al.* (2008) better results were achieved for some traits in cages with platforms but because of the low kindling rate the number of 19 days old rabbits per 100 inseminations was less for cages with platforms.

Analyzing the behaviour of rabbits in cages with platforms, Mirabito *et al.* (1999, 2005) observed that after the kits leave the nest box the does visit the platform more frequently and spend more time there which, however, does not decrease the number of suckling attempts. When the does leave the platform or the kits visit the platform there are opportunities for suckling.

In this study, the location preferences of rabbit does and their kits were analyzed in two types of pens with different platforms (wire-mesh or plastic-mesh).

## MATERIALS AND METHODS

### Animals and experimental design

The experiment was conducted at the experimental rabbit farm of Kaposvár University. The temperature was between 15 and 17 °C, and the lighting schedule was 16 hours light (06:00-22:00) and 8 hours dark (22:00-06:00). The animals consumed a commercial pellet *ad libitum* (digestible energy: 11.1 MJ/kg, crude protein: 18.0 %, crude fibre: 15.0 %). Water was also available *ad libitum* from nipple drinkers. The feeders and drinkers were placed in the lower level of the pens.

The female rabbits (n=31) at the age of 16.5 weeks were randomly allocated into two groups with different cage types:

**PP:** pen with plastic-mesh platform (102.5 x 52.5 x 97 cm included the 21.5 x 52.5 cm nest box), the cage floor was wire-mesh (wire diameter was 3 mm and the hole size of wires was 73 x 12 mm), the size of platform was 41.5 x 52.5 cm, which was disposed at 25 cm from the base (width of the plastic-mesh: 16 mm; hole size: 60 x 13 mm) (n=15),

**PW:** pen with wire-mesh platform (102.5 x 38 x 61 cm, included the 25 x 38 cm nest box), the cage floor was wire-mesh (wire diameter: 2.5 mm, hole size of wires: 60 x 12.5 mm), the platform was 28.5 x 38 cm, which was disposed at 26.5 cm from the base. Plastic footrest (40 x 25 cm, width of the plastic-mesh: 17 mm; hole size: 64 x 12 mm) was on the lower level, and partly (2/3) was below the platform (n=16).

### Behavioural observation

At the third and at the fifth kindlings the location preference of does and the platform usage of their kits were evaluated. Infrared cameras were placed above the pens, and 24-hour video recordings were performed. The location preference of rabbit does was observed twice a week on the same days (every Tuesday and Friday) from parturition until the 31st day of lactation. The location of the rabbits was also analyzed according to the different parts of the day (5:00-11:00; 11:00-17:00; 17:00-23:00; 23:00-5:00). The position of rabbit does on the platform, below the platform or in front of the platform was recorded at every 30 minutes (48 times a day). At the same time, between the ages of 18 and 31 days, the number of kits located on the platform or on the basic level was also counted.

### Statistical analysis

Statistical analysis was performed by Chi2 test using SAS 9.1 software package.

## RESULTS AND DISCUSSION

The results of location preference of rabbit does are summarized in Table 1.

In PP pens, during the active period (23:00-5:00), the does spent more time on the platform than during the light (resting) period (5:00-17:00). Opposite tendencies were observed under the platform. The preferences of this part of pens were 2.5-3.5 times higher between 5:00 and 17:00 hours than during the dark period (23:00-5:00). The effect of the parts of the day was smaller in the PW pens. The rabbit does also spent more time on the platform during the active (dark) period than between 5:00 and 17:00 when they stayed more frequently under the platform (2/3 part of the basic area of the footrest was below the platform). The parts of the day had slight effect on the rabbits' preference for the area in front of the platform. These findings may be related to the behaviour of the European wild rabbit that prefers living in shelter of dense scrub, and during the day (resting period) they stay in their warrens providing safety (Pérez *et al.*, 2008). Princz *et al.* (2008) reported that growing rabbits prefer the wire net top cages compared to open top cages.

**Table 1:** Location preference of rabbit does in pens with platform depending on the parts of the day

Location	Time spending of the does in different periods of the day (%)			
	23:00-5:00	5:00-11:00	11:00-17:00	17:00-23:00
Pens with plastic platform (PP)				
On the platform	65.1 <sup>a***</sup>	51.7 <sup>c***</sup>	51.0 <sup>c***</sup>	59.9 <sup>b***</sup>
Under the platform	9.6 <sup>d***</sup>	26.4 <sup>b***</sup>	34.0 <sup>a</sup>	20.4 <sup>c***</sup>
In front of the platform	25.2 <sup>a***</sup>	21.9 <sup>b***</sup>	15.0 <sup>c***</sup>	19.7 <sup>b***</sup>
Pens with wire-net platform (PW)				
On the platform	36.5 <sup>a**</sup>	28.0 <sup>b*</sup>	26.3 <sup>b***</sup>	36.1 <sup>a*</sup>
Under the platform	23.8 <sup>d***</sup>	32.0 <sup>b</sup>	38.5 <sup>a</sup>	27.3 <sup>c***</sup>
In front of the platform	39.7 <sup>a***</sup>	40.0 <sup>a***</sup>	35.2 <sup>b</sup>	36.5 <sup>a**</sup>

Means with different letters on the same row differ significantly ( $P < 0.05$ ).

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$  are significantly differ from the hypothetical location possibility (33.3 %) of the rabbit does in accordance with the floor space of the cage (except the functional nestbox).

On average the does spent by 25.2% more time on the platform when they were placed to PP pens compared to the PW pens. At the same time in the PW pens the rabbits stayed more frequently below and in front of the platform. Possibly the rabbits chose the most comfortable resting place. In the PP pens the cage floor was wire-mesh and the platform was plastic-mesh. On the contrary the PW pens were equipped by wire net platforms the footrests were located on the lower level partly (2/3) below the platform.

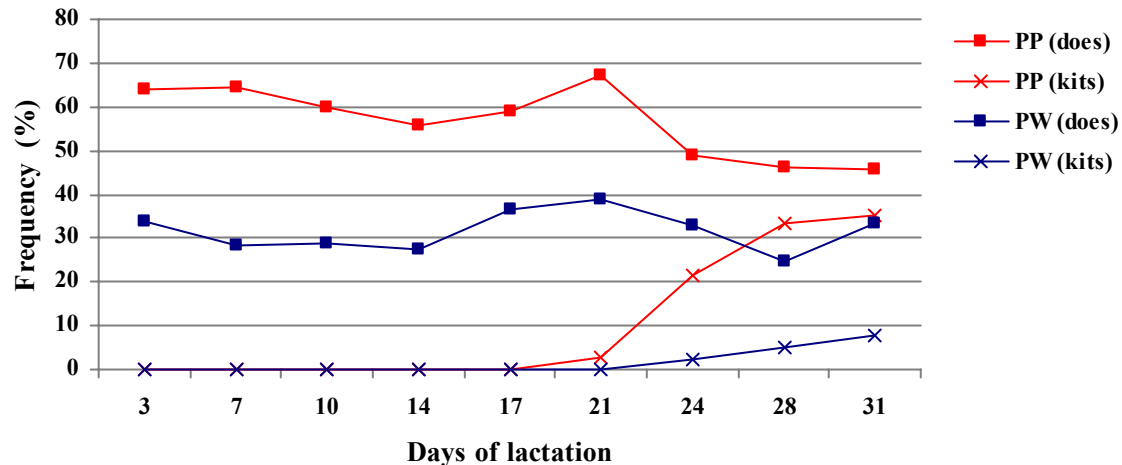
The ratio of the kits located on the platform and the time spending of does on the platform are shown in Figure 1.

In the PP pens the percentage of the platform choice of does ranged between 55.9 and 64.4% during the first 17 days. When the kits left the nest boxes, the utilization of the platform increased substantially and reached the maximum level at day 21 (67.1%). Afterwards the kits also utilized the platform with increasing proportion which decreased the using of platform by the does. Lower preference of platform by the does (25-38 %) could be observed in PW pens compared to the PP between parturition and weaning, but the tendency of using platform was similar. After the kits left the nest boxes the does also chose the platform more frequently, then after day 21, when the kits started to visit the platform, the does' platform preference decreased. In the literature platform preference was only observed when it was made from wire-mesh. Mirabito *et al.* (1999) observed the using of the platform only during the light period, and they reported that at the 2<sup>nd</sup> week and the period after kits left the nest box, non-lactating and lactating does spent 27, 20 and 35 % of their time on the platform.

Mirabito (2002), in another experiment, compared two groups. In the first group the does and their kits were in the same cage, in the second group kits were moved into another cage after nursing. Between the 3-5<sup>th</sup> weeks of lactation the platform preference of the groups were 32-42 and 12-16 %, respectively. Similarly to our results both studies showed that in the presence of the kits the does stay more frequently on the platform.

The French authors presented the average result of one or several weeks consequently the tendencies could be given more in detail by our present study. Mirabito *et al.* (2005) also analyzed the effect of the cage size. They found that the does in the smaller cages spent less time on the platform than those in the larger cages.

The kits started to visit the platform at the age of 17 days, and the platform preference of the kits increased until weaning. At the ages of 21 days 2.7 and 0.2 %, and 28 days 33.2 and 5.2 % of the kits stayed on the platform in PP and PW groups, respectively. Usage of the wire-mesh platform by kits was significantly lower than that of the plastic platform ( $P < 0.001$ ). In the experiment of Mirabito *et al.* (1999), at the 3-5<sup>th</sup> weeks of lactation 16% of the kits were located on the platform (Mirabito *et al.*, 1999). In our study, the difference in platform preference of the kits was mainly caused by the platform type (wire-mesh or plastic mesh) because the plastic-mesh was probably more comfortable also for the kits. The size of the platform also has to be taken into account as it was more than twofold in the PP pens. In the PW pens when the doe stayed on the platform the space was only sufficient for a few kits. As the does spent 68.3 %- of their time on the lower level the platform usage of the does only partially restricted the kits visiting the platform.



**Figure 1:** Platform usage of does and their kits in different types of platform cages

According to the literature the present of a platform did not affect the frequency of the nursing attempts (Mirabito *et al.*, 1999, 2005; Mirabito 2002). The does could not use the platforms to escape from the kits and rest undisturbed. After the does left the platform kits wanted to suckle. Considering animal welfare aspects cages equipped with platforms can be favorable. We did not observe the nursing attempts but it could influence the milk supply of kits. The effect of cage types on reproductive performance is presented in a separate paper (Mikó *et al.*, 2012).

## CONCLUSIONS

From the animal welfare viewpoint the application of cages/pens with platform can be considered advantageous, especially if the platform is made of plastic-mesh.

## ACKNOWLEDGEMENTS

Financial support of TECH\_05\_A3/2-2008-0384, NDA (National Development Agency) is gratefully acknowledged.

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