Housing and welfare of growing rabbits

Part II
Enrichment

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Keywords: rabbit keeping, environmental enrichment, elevated platform, gnawing stick

ABSTRACT

Conventional housing systems for rabbits provide feed and water but do not offer further installations for occupation. Recent development in regulations for commercial rabbit production consider environment enrichment as essential for the expression of the full behavioural repertoire of the animals and their welfare.

Research on enrichment of rabbits housing has been focused on various forms of elevated platforms and gnawing objects, such as wooden sticks or hay blocks. Elevated platforms are preferred sites for resting in cages and pens.

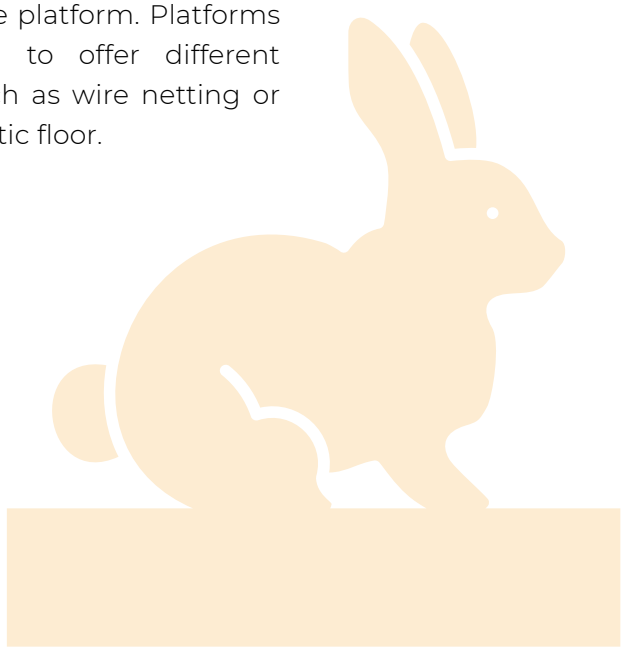
The platforms are especially attractive for the rabbits, when they are covered with a ceiling. In open pens the rabbits prefer to sit underneath the platform. Platforms may be used to offer different floor types, such as wire netting or perforated plastic floor.

There is no negative effect of platforms on performance. The effect of elevated platforms on welfare-related behaviours is not clear. Rabbits prefer gnawing sticks made of soft wood, such as linden.

Gnawing sticks are intensively used when fixed on a wall. There was no effect of wooden sticks on performance criteria, but positive results are shown with regard to aggressive behaviour, fear and ear injuries.

The consumption of hay or hay blocks as gnawing material leads to reduced growth.

Environmental enrichment increases the cost of production and increases the prices for rabbit meat.



INTRODUCTION

Part I of the article is dealing with the different housing systems and their main characteristics, such as group size, space and floor type.

Read Part I of the article

Enrichment devices are assumed to improve the animal welfare through more options to move and to increase the behavioural repertoire (*Verga et al., 2009*). There is increasing interest to study the effect of environmental enrichments on production and welfare criteria.

ELEVATED PLATFORMS

Elevated platforms increase the living area for growing rabbits inside the cages/pens, giving them greater freedom of movement in three dimensions, which is beneficial from the animal welfare point of view.

According to *Postollec et al. (2008)* elevated platforms in large pens are utilized for exercise. Greater movement possibility provided by platforms in cages and pens, have no significant influence on productive performance (*Krunt et al., 2020*).

Matics et al. (2014) compared cage housing (2 rabbits/cage) or pen housing (14 rabbits/pen) without and with platforms.

Feed intake, weight gain and body weight decreased only when platforms in pens were presented with deep litter. Differences in feed conversion ratio and mortality were not statistically significant.

Place preference of growing rabbits was examined in pens with wire-mesh or deep litter platforms (**Figure 1**).

The frequency of staying on or under the platform, and in the feeder and drinker area was studied (*Szendrő et al., 2012*).

Figure 1.
Experimental pens with wire-mesh and deep litter platforms.

In the case of the deep litter platform, rabbits were mostly observed underneath the platform while they preferred to stay on top of the wire platform (**Figure 2**).

The avoidance of the deep litter platform may be explained by problems of heat dissipation on the straw bedding and the preference for hidden places.

The avoidance of the area underneath the wire platform may be caused by prevention of urine excreted by pen mates on the platform. Installing a manure pan under the wire-mesh platform improved the acceptance of this area.

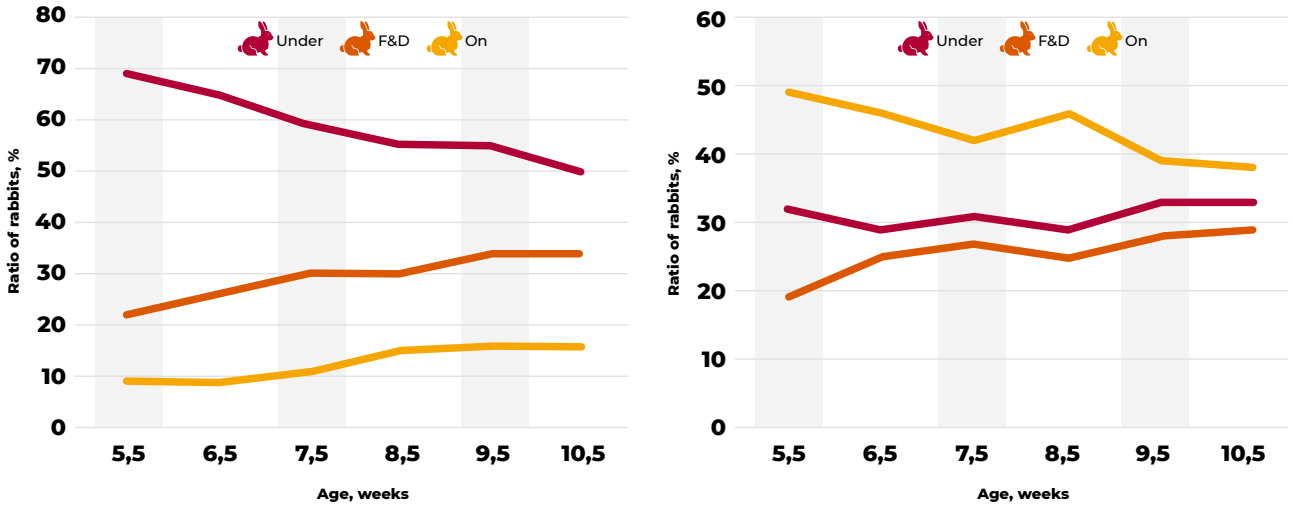


Figure 2.
Location preference of growing rabbits in pens with deep litter or wire mesh platform (Under: under the platform, F & D: at the feeder and drinker, On: on the platform) (Szendrő et al, 2012).

Farkas et al. (2016) examined production, mortality, number of injuries and stress hormone levels of growing rabbits in pens (1.86 m^2) with no elevated platform or two-level platforms made of wire-mesh or plastic-mesh (**Figure 3**).

There were no significant differences between the groups for the production traits. Authors also examined the location preference of rabbits (*Matics et al., 2018*).

Based on the floor area of the cage without platforms, the stocking density was 16 rabbits/m^2. For comparability, the number of rabbits was calculated per m^2 floor/platform area.

The highest density was on the wire-mesh floor, in front of the platforms (15.7 and 13.3 rabbits/m^2 in pens with wire-mesh and plastic-mesh platform, respectively) and under the platforms (9.8 and 8.3 rabbits/m^2, respectively).

There were fewer rabbits on the platform than on the floor: 2.7 and 5.8 rabbits/m^2 on the first level (7.8 and 9.1 rabbits/m^2 on the second level, respectively).

The choice of the area under the platforms (including the first level) may have been influenced by the fact that the rabbits on top could urinate on the pen mates below. At the same time, there were more rabbits on the plastic mesh than on the wire mesh platforms.

Figure 3.
Pen with two-level elevated platforms.

Lang and Hoy (2011) compared pens with and without elevated platforms. No difference was found in weight gain and body weight between the two groups. Percentage of body lesions was the same in pens with and without elevated platforms (26.4 and 28.5%, respectively).

They observed that at a younger age, the growing rabbits stayed more often on the platform in the dark period and more frequently under the platform in the light period. In the experiment of *Trocino et al. (2019)* the rabbits spent 20.6% of the time on the platform and 29.4% under the platform.

Trocino et al. (2018, 2019) observed a higher incidence of lesions associated to aggression in pens with elevated platforms (20.6%) than in pens without platform (11.7%). Significant differences were found in some other behavioural patterns.

A longer time resting in stretched position and biting or licking the pen elements in pens with platforms were observed compared to those without. At the same time, the time of drinking, allo-grooming and moving were lower in pens with elevated platforms.

Environmental enrichment

Hay, straw or gnawing sticks are most often given to growing rabbits. Among different environmental enrichments, gnawing objects have been tested (*Hansen and Berthelsen, 2000; Luzi et al., 2003; Princz et al., 2007; Jordan et al., 2008, 2011; Buijs et al., 2011*). They had few or no adverse effects on rabbit production performance (*Verga et al., 2004; Princz et al., 2007, 2008a; 2009; Zucca et al., 2012; Bignon et al., 2012*), whereas they may reduce stress, decrease aggressive interactions and fighting (*Princz et al., 2008a; Wagner et al., 2008; Lang, 2009; Buijs et al., 2011*).

Gnawing stick did not affect the production performance of growing rabbits, but reduce the incidence of abnormal behaviours, such as aggression or chewing of wire mesh (*Jordan et al., 2006*).

When rabbits were given the opportunity to choose between cages without or with gnawing stick, they spent slightly more time in the latter cage (53%), especially during the active period (56%) (*Princz et al., 2008a*). The preference of gnawing wood from nine different tree species was examined by placing 3 different sticks of trees in each cage (*Princz et al., 2007*).

Gnawing stick made of linden tree were the most preferred, followed by white willow and white horse chestnut. The rabbits consumed little material of white acacia and rejected black elder, European larch, European white birch and white mulberry.

White acacia gnawing stick did not affect ear injuries when compared to a control without gnawing stick (*Princz et al., 2009*). Hard wood of white acacia was less efficient in reducing the incidence of ear injuries than soft wood of linden as compared to cages without gnawing stick (*Princz et al., 2007*; **Figure 4**).

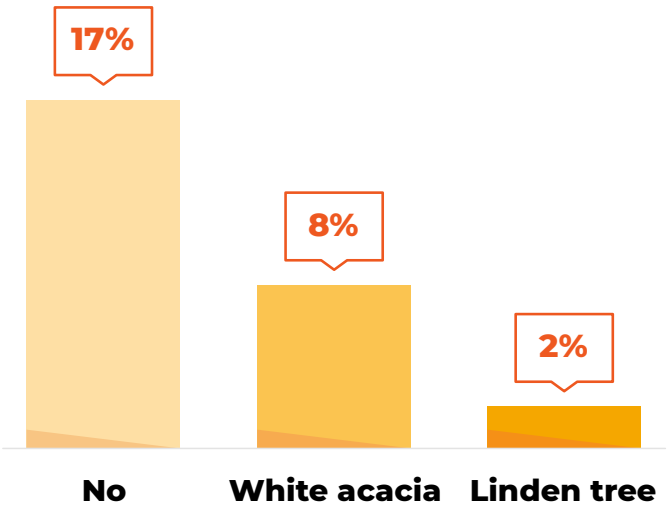


Figure 4.
Incidence of ear injuries in growing rabbits depending on the absence of gnawing stick (No) in the cage or inserted stick made of White acacia or Linden tree (Princz et al., 2007).

In addition to the type of material of gnawing stick, their size and position in the cage are also important. Large hardwood gnawing sticks hanging free moving from the top of the cage, make gnawing difficult (*Luzi et al., 2003*).

According to *Princz et al. (2007)* softwood gnawing sticks, which are horizontally attached to the side wall of the cage are easily accessible and considered more suitable for gnawing (**Figure 5**).

Figure 5.
The gnawing stick should be placed in the cage so that the rabbits have easy access.

Birolo et al. (2022) observed group housed rabbits with or without gnawing hay blocks as enrichment material. The presence of gnawing blocks scarcely affected performance criteria and the behavioural time budget, but it reduced fear response as assessed in the open field test and novel object test.

Supplementation of hay decreased slightly production performance and slaughter results, and significantly reduced ear injuries, especially in larger groups (*Szendrö et al., 2015*). Supplementation of hay or straw was economically not favourable. The material falling to the floor can bear health risks when contaminated with faeces and urine.

CONCLUSIONS

Installation of elevated platforms is useful tool to enrich cages and floor rearing systems. Raised platforms increase the floor space and improve the animals ability to move and to choose the best place in the cage or pen.

The easiest way for environment enrichment is using gnawing stick. Softwood (e.g., linden tree) gnawing stick placed at the head height of rabbits is best suited. It reduces aggression, fights and injuries, especially in group-reared rabbits.

Enrichment increases the production costs of rabbit meat. Since rabbit meat is more expensive than other meat of farm animals, such as poultry and pork, it may not be affordable by poorer consumers. The consumers should be given freedom to decide on which housing system they accept.

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