

# Environmental enrichments for farmed rabbits



## Introduction

Rabbits are highly active and social animals with strong behavioural needs such as gnawing, digging, foraging, hiding, and social interaction. Conventional barren wire cages (Fig.1) restrict these behaviours, often resulting in chronic stress, aggression, stereotypies, and health problems. The introduction of environmental enrichment (Fig.2) —defined as physical, social, sensory, occupational, or nutritional stimuli— has been proven essential for promoting behavioural needs and improving animal welfare. Despite clear welfare benefits, enrichments remain inconsistently applied across commercial farms due to economic, hygienic, and logistical constraints. Overall, enrichment strategies play a crucial role in enhancing rabbit welfare through behavioural, and physiological improvements. This factsheet provides a comprehensive synthesis of environmental enrichment for breeding does and growing rabbits, focusing on the main categories: **social**, **sensory**, **physical**, **occupational** and **nutritional** types, and their effects on animal welfare, integrating behavioural, physiological, and performance outcomes.



## Legal requirements

**Council directive 98/58/EC** concerning the protection of animals kept for farming purpose:

“Members States shall ensure that the conditions under which animals (other than fish, reptiles or amphibians) are bred or kept, having regard to their species and to their degree of development, adaptation and domestication, and to their physiological and ethological needs in accordance

with established experience and scientific knowledge [...]” (Article 4)



Figure 1. Rabbits kept in bicellular cages



Figure 2. Group-housed Rabbits in enriched elevated pens.

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## Enrichment types and effects on welfare on breeding does and growing rabbits

### Social enrichments

**Definition:** provision of **direct contact** with conspecifics (in pairs or groups) or **indirect contact** by visual, olfactory, and auditory cues from conspecifics housed in the same room (Baumans, 2005). The two main social enrichments are *Group housing* and *Mirrors*.

**Group Housing:** Group housing for rabbits involves providing a shared space that allows direct contact with conspecifics, meeting their social needs. Rabbits housed in pairs or groups exhibit fewer abnormal repetitive behaviours (Gerson, 2000; Chu et al., 2004) and demonstrate a greater range of natural, species-specific behaviours (Chu et al., 2004) compared to those housed individually.

**Recommendation:** Group housing is currently recommended for growing rabbits only, because of the risk of aggression and injuries occurring among breeding female rabbits.

**Mirrors:** The use of mirrors in rabbit cages provide visual contact through reflections simulating social interaction, and encouraging natural behaviours such as olfactory exploration (Jekkel & Milistis, 2009). Rabbits showed increased grooming and activity in single cages enriched with mirrors compared to fully isolated rabbits, suggesting that mirrors can partially mimic social interaction (Mastellone et al., 2019). Dalle Zotte et al. (2009) found a consistent preference for mirrored areas in fattening rabbits kept in pens for scientific research, and Edgar and Seaman (2010) proposed that mirrors can be a substitute for social contact in singly housed female laboratory rabbits when social contact is not possible.

**Recommendation:** The use of mirrors may only be a palliative measure to mimic social contact among animals that need to be reared alone, but it does not replace the benefits of real contact between conspecifics.

### Physical or Structural enrichments

**Definition:** physical elements that increase environmental complexity. The most popular enrichments consist on elevated platforms and hiding elements, like tubes or boxes which enhance both breeding does and growing rabbits' behavioural repertoire, promote more diverse spatial use, and help reduce stress.

**Elevated platforms:** Elevated platforms offer additional opportunities to express species specific behaviours, encouraging physical activity and resting without compromising health or productivity (Postollec et al., 2008; Farkas et al., 2016; Matics et al., 2018; Trocino et al., 2019). Studies have shown that plastic-mesh platforms attract more rabbits per square meter compared to wire-mesh ones (Matics et al., 2018). Similarly, breeding does and their kits at 28 days of age showed a clear preference for plastic-mesh platforms over wire-mesh alternatives (Mikó et al., 2014) (Fig.3).



Figure 3. Breeding doe above a plastic platform

**Recommendation:** Elevated platforms are the most effective and practical physical enrichment, creating hiding spaces and encouraging a greater behavioural repertoire in both fattening rabbits and does. As the use of platforms can cause increased soiling in cages, it is important to pay attention to cage hygiene and schedule regular cage cleaning procedures. In addition, the platform should be made of slatted plastic or have at least one slatted plastic resting mat.

**Hiding places (i.e., plastic tubes or shelters):** The use of shelters in laboratory rabbits reduces stress-related behaviours and improves welfare by providing hiding places and greater opportunities for environmental interaction (Hansen and Berthelsen, 2000). However, research findings in commercial settings show limited impact on aggressive behaviour and injuries of rabbit does (Rommers et al., 2014b) and limited use in growing rabbits near the slaughter age (63-70 days) with negative effects on growth (Trocino et al., 2019).



Require optimization for size, design, and placement in commercial group-housed systems.

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Figure 4. Example of a hiding place for growing rabbits

## Occupational enrichments

**Definition:** Manipulable or gnawing material promoting mental engagement, opportunities to explore, manipulate objects, and make choices, which help prevent boredom and the development of abnormal behaviours.

**Manipulable material:** It increases the time spent performing active, exploratory (Coda et al., 2020; Vilardo et al., 2025), digging (Kront et al., 2023) and chewing behaviour with reduced abnormal behaviours (cage biting) (Poggiagliolmi et al., 2011). The use of manipulable material improved productive performance, final body weight, weight gain, feed conversion rate (Elsayed et al., 2024). Moreover, it lowered serum cortisol levels, and improved gut health (Feng et al., 2022). Example of manipulable material: plastic balls, toys with bells, empty cans, destructible devices, digging substrates (i.e., ground soil).

**Gnawing material:** It facilitates the expression of species-specific behaviours such as gnawing (Baumans, 2005; Huang et al., 2021), allo-grooming (Trocino et al., 2013), and eliminated biting, licking bars or aggressive behaviours in growing and laboratory rabbits (Trocino et al., 2013; Berthelsen and Hansen, 1999). In the absence of such materials, rabbits frequently develop abnormal behaviours, including stereotypies and aggression (Verga et al., 2004; Princz et al., 2007, 2008, 2009; Bozicovich et al., 2016). Rabbits consistently spend more time in environments where gnawing substrates are available (Princz et al., 2008).

The provision of gnawing material slightly reduced aggressive behaviour in does kept in a part-time housing system (Van Damme et al., 2024).

### Example of Gnawing Material:

- **Straw:** >12-week-old rabbits (Lidfors, 1997) and breeding does (Rommers, 2014 a)
- **Wooden sticks:** growing rabbits (Bozicovich et al., 2016; Princz et al., 2008) (Fig. 4)
- **Pressed hay cubes:** >12-week-old rabbits (Lidfors, 1997); breeding does (Van Damme et al., 2024); growing rabbits (Birolo et al., 2022) (Fig. 5)

### Position in the cage:

- **Growing rabbits:** sticks should be mounted horizontally on the cage (Princz et al., 2007) better than suspended (Luzi et al., 2003);
- **Does:** gnawing material should be put on the platform (Rommers et al., 2014b).



High stocking densities, can restrict individual access to gnawing materials, potentially leading to abnormal behaviours such as stereotypies and aggression.

**Controversial aspects:** some studies show no significant effects of the use of gnawing material (Jordan et al., 2008), or even increased aggression in specific situations, such as mixed-gender groups (Bozicovich et al., 2016). These discrepancies highlight the presence of influencing factors such as group size, physiological status, housing design, and individual behavioural traits on gnawing material.

**Gap of knowledge:** No studies have yet assessed rabbits' motivation to access gnawing materials using validated methods such as willingness-to-pay or other motivation-based tests.

**Recommendation:** The use of natural, chewable materials is the prevailing recommendation. Special attention is needed to the position of the gnawing materials in order to ensure accessibility and hygiene (EURCAW Poultry SFA, 2022). There is gap of knowledge regarding the safety and usefulness of not edible occupational enrichments in promoting on-farm rabbit welfare.

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Figure 5. Pressed hay cubes put inside a wire basket surrounded by wooden sticks

## Nutritional enrichments

**Definition:** Provision of food in a way that encourages rabbits to forage for or work to obtain their food. This type of enrichment promotes the welfare of domestic rabbits by supporting their natural behaviours such as foraging, chewing, and exploration.

Nutritional enrichments for rabbits do not differ from the gnawing materials previously mentioned and recommended in the previous paragraph.

## Sensory enrichments

**Definition:** Enrichment that engages the senses such as sight, hearing, smell, and touch, enhancing the welfare of rabbits by promoting species-specific behaviours. Music is the only form of sensory enrichment that has been tested on rabbits.

**Music:** Low-volume instrumental music, such as soft spa or classical music, has been found to help calming female laboratory rabbits, making them less skittish and more relaxed—effects especially noted in breeds like Dutch Belted and New Zealand Whites. Supporting this, Peveler and Hickman (2018) studied individually housed male New Zealand White rabbits used in research, assessing chronic stress via faecal cortisol and heterophil-to-lymphocyte ratios. Results showed reduced chronic stress during music exposure and increased stress after its removal. However, the study has several limitations (small sample size, lack of a control group, differences based on age, breed, or behaviour).

Few studies on the use of sensory enrichment, such as music, have been published. However, the use of music is a common practice used by many farmers to calm rabbits. Unfortunately, this is an area that requires more valid scientific information and no recommendation can be given.

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