Question raised by requestor

In connection with the implementation of the Government Regulation on the establishment of conditions for the implementation of the Animal Welfare measures, we are preparing methodologies for good husbandry practice in the field of animal welfare with a focus on environmental enrichment, and that is why I would like to ask you to provide suitable studies, recommendations or methodologies for cattle. Specifically, the location, frequency of inspection and maintenance of gossipers, rinsing tubs in the stable and appropriate hoof disinfectants.

Recommendation/studies on other environmental enrichment for cattle is welcomed.

Clarification was made regarding the terms 'gossiper' and 'rinsing tubs', which refer to a mechanical grooming brush for scratching cattle and appropriate hoof care namely a disinfection foot bath, respectively.

Answer

EURCAW *Ruminants & Equines* received the question 28 February 2023. The first answer regarding enrichment and individual housing of calves was sent 12 April 2023.

This answer describes legislation and research on the use and management of cow brushes.

Regarding mechanical grooming brushes, EURCAW *Ruminants & Equines* provides further background on this welfare topic in the review 'Sensory and feeding enrichment in ruminants and equines' (Ginane & Rørvang, 2023); https://www.eurcaw-ruminants-equines.eu/knowledge_base/sensory-and-feeding-enrichment

Demand of grooming brushes in legislation

To our knowledge, Denmark is the only Member State in the European Union with a compulsory demand in their national animal welfare legislation to provide brushes for dairy cows. The legislative limit is at least one rotating brush per 50 cows. In addition, the Danish regulation (Ministeriet for Fødevarer, Landbrug og Fiskeri, 2020) has requirements about the width of crossways where brushes are placed, summarised in Table 1.

Table 1: According to Danish regulations, the minimum width of crossways with brushes, depending on breed size and cubicle housing design.

		Width of crossways	
		Small breeds	Large breeds
Stables up to 3 rows of cubicles	Cow brushes **or** drinking troughs are placed in a cross passage	3.7 m	4.0 m
	Cow brushes **and** drinking troughs are placed in a cross passage	4.7 m	5.0 m
Stables with more than 3 rows of cubicles	Cow brushes **or** drinking troughs are placed in a cross passage	5.1 m	5.5 m
	Cow brushes **and** drinking troughs are placed in a cross passage	5.6 m	6.0 m

Grooming behaviour

Grooming behaviour is a natural behaviour, which helps the animal to remove mud, faeces, urine, insects and parasites from the skin. Grooming is also important for the thermoregulatory ability and in maintaining health (Goncu et al., 2019). In dairy calves, Horvath et al. (2020) reported that provision of a brush reduced pen-directed sucking (38.4 vs. 59.0 min/12 h observation) and also reduced standing time around milk feeding. McConnachie et al. (2018) found that dairy cows are similarly highly motivated to access a mechanichal brush and to access fresh feed when choosing either one or the other resource. According to Velasquez-Munoz et al. (2019) the use of a mechanical brush influenced behaviour, reducing not-active time, while increasing eating time. DeVries et al. (2007) reported that the mechanical brush allows the cows to satisfy more of their natural grooming motivation. They found that 93 % of the cows used the

brush within one week and the total grooming time spent scratching increased by 508 % compared to the grooming performed before the insertion of brushes. Of the total grooming time, 91 % was related to the mechanical brush. In accordance, Georg and Totschek (2001) reported that all cows in their study used the brush within one week. The brushes were used on average 3.3-5.8 times per day per cow. In addition, Georg & Totschek (2001) found that the dominant cows used the brushes the most during the most popular time for brushing i.e. directly after milkings, also confirmed by Mandel & Nicol (2017), and during the late hours of the evening, although there were no differences in total usage between dominant and low ranked cows. Preferred body parts for brushing were the head, but also the neck and back (Georg & Totschek, 2001).

Cows expressed an elevated need for tactile stimulation directly after parturition, when separated from the calf (Mandel & Nicol, 2017). On the day after parturition, 90 % of cows used the brush, on average 6 ± 8 minutes per day. In the following weeks, the average daily duration of brush usage declined to 2 ± 2 minutes per day for the rest of the lactation period (Mandel & Nicol, 2017). Heifers used brushes both for grooming and for oral manipulation (Van Os et al., 2021). Schukken & Young (2009) found an approximate 3.5 % (1 kg) higher daily milk production for cows with brushes in the second lactation compared to cows with no brushes in the control group, although no differences were found in other lactations.

Placement of brushes and health detection

When energy resources in cattle are limited or when the cost involved in the activity increases, so called 'low-resilience activities' decrease e.g., brush usage (Mandel et al., 2017). If a brush is placed in close proximity to the feed, it will be used more frequently. According to Mandel et al. (2013), the number of brushing events increased 62 % if the brushes were placed closer to the feed (average distance 15 vs. 21 m). Furthermore, cows with lameness will use the brushes more frequently if they are placed in close proximity to the feeding bunk (Mandel et al., 2018).

Postpartum stress is shown to reduce the use of brushes (Lecorps et al., 2021), and the use decreases when energy resources are limited, i.e. during stress and sickness (Mandel et al., 2018), e.g. metritis (Mandel et al., 2017). Monitoring brushing activity may also indicate stress-related changes in cow behaviour. Usage decreased on days of artificial inseminations and on days of high temperature-humidity index (Mandel at al., 2013).

Animal interactions and number of brushes

Brushes are valued resources, although in a study by Val-Laillet et al. (2008) less than 3 % of the observed aggressive behaviours were related to the mechanical brush. The other aggressive interactions observed were related to the feeding area and the stalls (88 % and 10 % respectively). Nevertheless, when including time spent at stalls, feeders and brushes respectively, displacements were more frequent for access to the brushes (Val-Laillet et al., 2008). Foris et al. (2021) reported that subordinate cows never reached the levels of brush use observed for the dominant cows. According to Reyes et al. (2022) total brush use and competition are not affected by brush quantity, but heifers with access to more brushes use them for longer, suggesting greater opportunity for uninterrupted use. EFSA (2023) proposes brushes to be available in all loose-housing systems, but the report concluded that further research is needed to decide on the location of brushes and the appropriate number per cow. Goncu et al. (2019) recommended one brush per 50-60 animals.

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