



## Canine Research

## Behavioral observations in dogs in 4 research facilities: Do they use their enrichment?



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## ABSTRACT

European legislation recommends comfortable resting areas, toys, and chews in laboratory dogs' husbandry. However, there is no standard "enrichment" defined for laboratory dogs as yet. Different research facilities provide different housing conditions and forms of enrichment. To get an overview of the behavior of dogs in their usual housing conditions in different laboratories and to evaluate whether and how much they use the enrichment available to them, the present study was conducted in 4 research facilities (A–D) by videotaping 47 beagles over a 24-hour period. Housing conditions differed widely between facilities. In 3 facilities, the kennels were equipped with resting areas (A: dog beds, B: elevated lying boards, C: low lying boards), 2 facilities provided chewing objects that were permanently available (A: branches, C: dental balls), and 2 facilities enabled permanent access to outdoor runs (C, D). The dogs frequently used available indoor resting areas, mainly in company and as a whole group (mean of 0.83 in the 80% confidence interval with a lower bound of 0.59 and an upper bound of 0.94) and particularly during the night (dog beds with bedding in A: 83.1%–95.6% of ca. 17 hours in the indoor kennels; elevated plastic lying board in B: 50.2% of 24 hours; 75.4% of 12 hours at night; low lying boards in C: 60.3% of 24 hours; 79.8% of 12 hours at night; percentages represent mean portion of time per dog). The dogs only rarely lay on the ground when dog beds or lying boards were available. The permanent available chews, branches in the runs or dental balls, were only rarely used. Permanent access to outdoor runs was predominantly used during daytime (C: 41.8%, D: 24.1% from 6 to 18 hrs.) and as exclusive defecation area. Aggressive behaviors such as baring teeth, snapping, or biting did not occur. Only 2 of the 47 dogs showed repetitive behaviors lasting for more than 5 minutes. Coprophagy occurred very frequently in all 4 facilities, and 1 facility with the youngest dogs had the highest mean incidence of 5.3 times per dog during 24 hours. This study confirms the importance of resting areas as permanent enrichment and shows the willingness and desire of laboratory dogs to use defecation areas away from their resting areas. However, the attractiveness and safety of chews and toys require further research.

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## Introduction

Housing conditions that do not meet the social or physical needs of laboratory animals may lead to changes in physiology and behavior, thereby influencing research data (Hubrecht, 2002). As a result, increasing attention has been paid to improve and enrich the housing conditions of laboratory animals, in particular those of laboratory dogs (Hubrecht et al., 1992; Hubrecht, 1993; Loveridge, 1998; Hubrecht, 2002; Bayne, 2003; Joint Working Group on

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Refinement, 2004; Wells, 2004; Overall and Dyer, 2005). It is recommended in the revised Appendix A of the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes (ETS No. 123; Council of Europe, 2006) and the corresponding Recommendation of the European Commission (2007) to provide laboratory dogs with elevated platforms, dog toys, and chews. The European Directive 2010/63/EU (2010) demands a “comfortable resting area for all animals” and enrichment techniques to increase “manipulative and cognitive activities.” Only few studies exist regarding enrichment in laboratory dogs. Hubrecht (1993) provided elevated platforms and toys suspended from chains (Hubrecht, 1993, 1995). In contrast, Pullen et al. (2010) did not recommend hanging toys because the observed dogs preferred toys on the ground. Robust toys were only rarely used by the dogs. Schipper et al. (2008) conducted a pilot study on a rubber toy stuffed with treats in individually kenneled laboratory dogs. Other studies concern enrichment in kenneled shelter or working dogs (Wells and Hepper, 2000; Gaines et al., 2008).

Because there are few data on this subject and no standard for “enrichment” is defined for laboratory dogs, different research facilities provide different enrichment items in their dogs’ husbandry depending on what is understood to be appropriate and what works in practice, thereby making discrete and largely self-contained experiences. Therefore, we were interested in the following questions: How are laboratory dogs housed in different research facilities in Germany? What forms of enrichment are provided? How is this enrichment used by the dogs? Are outdoor runs available? Do the dogs use them? Because Sales et al. (1997) and Scheifele et al. (2012) reported problematic noise levels in kenneled dogs’ husbandry, we furthermore considered environmental conditions such as noise levels and harmful gas concentrations to detect possible problems. The aim of this study was to get an overview of the aforementioned aspects and to detect areas where further research is needed.

## Materials and methods

### Dogs

Forty-seven beagles of both sexes (31 females, 16 males, one of them castrated), kept in stable groups, were observed in 4 facilities A, B, C, and D. In A, they comprised eleven 1- to 10-year-old females and 1 neutered male. The dogs were housed in indoor kennels in 5 groups consisting of 1 to 3 dogs. During daytime, they were brought to outdoor runs where they stayed in slightly different group composition for 5 to 6 hours (4 groups consisting of 2 to 4 dogs per group). In B, 6 males and 4 females, aged 1 year, were housed in 5 groups of 2 dogs per group. In C, 6 males and 5 females, aged 5 to 6 years, were kept in 3 groups of 3 to 5 dogs per group. In D, 3 males and 11 females, aged 1 to 6 years, were kept in 3 groups of 3 to 6 dogs per group.

### Husbandry

In A, the 6-m<sup>2</sup> indoor kennels with concrete floor were equipped with 1 metal or plastic bed per dog. The beds were filled with wood chips and located opposite to the kennel door. In the runs, a wooden doghouse and either an igloo or a plastic dog crate was available. In B, the 11-m<sup>2</sup> indoor kennel with concrete floor had a 3-m<sup>2</sup> front partition with a 186 × 50 cm plastic lying board which was fixed on the wall at a height of 40 cm, and an 8-m<sup>2</sup> back partition without enrichment, both connected by a door. In C, the 11-m<sup>2</sup> indoor kennels with tiled floor had two 100 × 100 cm large resin composite lying boards on the ground; the runs were equipped with plastic crates. In D, rubber mats covered the 7-m<sup>2</sup> indoor kennel floor.

Pertinent to the German Animal Welfare Dog Ordinance (Tierschutz-Hundeverordnung, 2013), the dogs in A were daily taken to their 29- to 54-m<sup>2</sup> large, concrete floored runs for 5 to 6 hours. In B, the dogs were taken in groups to a 149-m<sup>2</sup> open air gravel floored run area, for several hours, except on rainy days. On the day of our observations, they stayed indoor. In C and D, the dogs had permanent access to open air runs through a swing door; in C, there were 59-m<sup>2</sup> large runs, including 10-m<sup>2</sup> roofed areas with tiles and gravel; in D, there were 18-m<sup>2</sup> large runs with stone slabs or washed-out concrete. The fences of the runs of all facilities did not obstruct the outside view.

In A, B, and C, the dogs were fed with dry food at 8 AM, 12 PM, and 12.30 PM, respectively. In D, a fresh diet was prepared on site and fed at 8 AM.

The 4 facilities were the same as described in Döring et al. (2014).

### Removable enrichment

In A, natural tree branches and in C, dental balls (Nylabone, Neptune, NJ) were permanently available in the runs. In D, beef bones were given once a week for about 2 hours under supervision by the caretakers, also on the day of our observations. Horn of calf hooves was regularly given in A as additional chews, but not on this observational day. In B and D, the caretakers regularly played with the dogs using toys such as balls or tugs. This was not the case on our day of observation.

### Climatic conditions

Indoor temperature and humidity were recorded during the 24-hour observation period using a thermohygrograph. CO<sub>2</sub>, NH<sub>3</sub>, and H<sub>2</sub>S concentrations were measured using a Miniwarn gas meter (Draeger, Lübeck, Germany) in the morning before the kennels were cleaned.

### Noise level

Indoor noise levels were measured during 24 hours using a data-logging sound level meter (model C-322, Reed Instruments, Wilmington, USA). In A, the sound level meter was taken outdoor when the dogs were brought to their outdoor runs. In A, B, and C, the measurements were taken every 3 seconds, in D, every 15 seconds.

### Video evaluation

Dog behavior was video-recorded over 24 hours starting at 8 AM using 8 × time lapse (Sony Time Lapse Videocassette Recorder SVT-124 P). To view the entire area that was available to the dogs, up to 3 cameras (Sony Camera B/W 1/3" CCD) were used in each kennel and/or run. Night tapings were carried out with 30-watt red lights in the indoor kennels and in the roofed runs in C. “Daytime” was defined between 6 AM and 6 PM, “nighttime” between 6 PM and 6 AM. The cleaning of the kennels by the caretakers was completed before the start of the videos at 8 AM.

The use of enrichment during the 24-hour observation was evaluated by Behavior Sampling und Continuous Recording as described by Martin and Bateson (2007). To this end, the beginning and ending of the usage time of each enrichment item was recorded continuously. When more than 1 dog used the item, the number of dogs was also noted. Furthermore, the frequency of “aggressive behavior,” defined as baring teeth, snapping or biting, and coprophagy, as well as “repetitive behaviors,” defined as “circling,” “pacing around,” or “scratching on the floor” for more than 5 minutes, were recorded. Each defecation was noted with information about location.

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