

HOUSING OF RABBITS WITH RESPECT TO ANIMAL WELFARE

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1. Abstract

Disorders in behaviour and movement in rabbits conventionally kept singly in cages were the starting-points of our investigations. Therefore growing and adult rabbits were kept singly in cages or alternatively in a group on the floor or on slatted floor out of plastics. We studied behaviour, compact and cancellous bone and meat. The results show in a clear way that rabbits kept in groups on the floor can avoid damages which cannot be done by caged rabbits, i.e. cage housing is not a species suitable housing system for rabbits.

2. Introduction

Our experiences with rabbits singly kept in cages agree with reports of professional rabbit raisers, who manage rabbit husbandry and fattening usually in cage systems: those rabbits again and again display disorders in behaviour as well as damages of the skeletal system and lesions at the lower side of the paws that lead to disorders in locomotion.

In contrast to these observations the 2nd paragraph of the topical German law of animal welfare (Tierschutzgesetz) prescribes: 1. everyone keeping an animal and caring for it has to feed and to take care of it in a manner that considers adequate to the animal's species and needs and he has to house it suitable to its behaviour. 2. It is forbidden to limit the animal's possibility to species suitable locomotion in a way causing pain or avoidable suffering or damage. According to this paragraph we often have to establish a big dilemma by comparing law and reality. But what are the reasons for the animals' injuries?

Therefore we made a lot of comparing investigations by keeping young and adult rabbits singly in conventional cages or in alternative housing systems in groups on the floor.

The results show in a clear way: Keeping rabbits singly in cages is not compatible with the demand of the law on housing with respect to animal welfare because 1. the singly caged rabbit has no social contact to conspecifics what is necessary as natural external stimulus and 2. singly caged rabbits have no conditions for species suitable locomotion in an adequate area.

Consequently we proved alternative housing systems for rabbits during the fattening as well as the rearing periods and we developed important measures for a rabbit housing system with respect to animal welfare.

3. Material and Methods

3.1. Material

Table 1: Animals

exp.	animals	comparing systems
A	2 x 10 Zika-does, 2 years	10 x 1 rabbit on the floor (1.5 qm/animal) ./. 10 x 1 rabbit / cage (0.27 qm/animal)
B-1	2 x 10 female Chbb 2 years	1 x 10 rabbits on the floor* (0.42 qm/animal) ./. 10 x 1 rabbit / cage (0.18 qm/animal)
B-2	2 x 10 female Chbb 17 weeks	1 x 10 rabbits on the floor* (0.42 qm/animal) ./. 5 x 2 rabbits / cage (0.09 qm/animal)
C	58 Zika fattening rabbits, 12 weeks	C-0: 12 rabbits on the floor* (0.35 qm/animal) ./. C-1: 10 x 1 rabbit / cage (0.44 qm/animal) ./. C-2: 6 x 2 rabbits / cage (0.22 qm/animal) ./. C-3: 4 x 3 rabbits / cage (0.15 qm/animal) ./. C-4: 3 x 4 rabbits / cage (0.11 qm/animal)
D	40 Zika fattening rabbits, 12 weeks	20 x 1 rabbit / cage (0.3 qm/animal) ./. 1 x 30 rabbits on the floor* (0.16 qm/animal)

* floor (1.90 x 2.20 m)

Table 1 gives a summary of the animals' groups with regard to their race, age, cage and housing systems. Zika means New Zealand white hybrid rabbits (Fa. Dr. E. Zimmermann, Germany) and Chbb are Chinchilla-experimental-rabbits (Fa. Dr. K. Thomae, Germany).

3.2. Methods

3.2.1. Behaviour

The investigations of the behaviour were carried out with a time-sampling-method: the topical observed kinds of behaviour were registered by a special table with all possible kinds of behaviour observed in intervals of 5 minutes. The single kinds of behaviour were calculated as percentage of the total observed behaviour.

3.2.2. Compact and cancellous bone

After slaughtering, radiographing and weighting the rabbits, the long hollow bones (humerus, radius, os femoris and tibiofibularis) were dissected and measured. For the ribs and the thoracic and lumbar vertebrae the transversal sections of bones were decalcified and then histologically prepared by the paraffin-method using a reformed Giemsa-staining (Drescher, 1990). The material was studied in comparison macroscopically, histologically, and the samples of compact bone particularly, histomorphometrically (Morphomat 30, Fa. Zeiss).

The statistical evaluation followed by the U-test of Wilcoxon, Mann and Whitney (Sachs, 1984). The bones were studied by the following parameters:

1. SKG = slaughter body weight (g)
2. L = length of bone (mm)
3. G = weight of bone (g)
4. DF = average area of diaphysis (mm²)
5. KF = area of compact bone in the middle of the diaphysis (mm²)
6. k = percentage of KF in DF (%)
7. MQ = quotient of G : L (g/mm)

3.2.3. Meat

The meat of the hindlimbs and the back of the rabbits were analysed chemically, physically and organoleptically in cooperation with the Bundesanstalt für Fleischforschung in Kulmbach.

Table 2 gives a review to the subjects that had been investigated in the different animal groups.

Table 2: subjects of investigations

group	subjects of investigation
A	1. behaviour 2. compact bone 3. cancellous bone
B-1	1. behaviour 2. compact bone
B-2	3. cancellous bone
C	1. compact bone
D	1. meat

4. Results

4.1. Behaviour

- Caged rabbits showed a more nervous behaviour than rabbits out of groups.
- Caged rabbits showed altered forms of movement because of the narrowness of the cage.
- Caged rabbits showed a less relaxed resting-behaviour because of the narrowness of the cage and the wire floor. (LOEFFLER et al., 1991)

4.2. Bone

- Caged rabbits showed a tendency for clearly thinner long hollow bones than animals of alternative housing systems, i.e. hypoplasia of the long hollow bones.
- The long hollow bones of the hindlimbs showed this effect in a higher degree than those of the forelimbs.
- The singly caged rabbits (gr. C) showed a higher body weight but thinner long hollow bones than rabbits of all other groups.
- In regard to the skeletal growth of the rabbits the thickness of the diaphysis had evidentially been influenced by the housing system, whereas the skeletal differentiation had not been influenced by the housing system. (DRESCHER, 1989; DRESCHER and LOEFFLER, 1991, 1992)
- X-ray studies showed that caged rabbits have deformities of the vertebral column (scoliosis, kyphosis and lordosis of the thoracic column).
- Histological investigations showed that the lumbar vertebrae of caged rabbits showed rarefacted beams of the cancellous bone in number and thickness. (ROTHFRITZ et al., 1992)

4.3. Meat

- The caged fattening rabbits showed an insignificant higher body weight in comparison to the alternatively kept rabbits, both having the same percentage slaughter output.
- In regard to the valuable meat portions, back and leg, the back portion is a bit smaller and the legs are significantly smaller in caged than in alternatively kept rabbits.
- Caged rabbits had more intraabdominal fat than compared animals.
- The chemical analysis of the meat of the legs showed the same contents of proteins in caged as in alternatively kept rabbits but higher water and crude fat parts with lower ash contents.

This higher intramuscular fat part is positively correlated to a higher content of unsaturated fatty acid that explains the physically measured higher rigor which is representative for a higher degree of softness (HERZOG, 1991).

4.4. Paws

Because of unsuitable wire floors, high body weights (> 5 kg) and deficient hygienics, rabbits get injured at the lower side of their paws (ulcerative pododermatitis). Cage housing promotes these alterations (DRESCHER, 1992).

5. Consequences

Starting from the results of our comparing investigations we developed housing systems for rabbits with conditions suitable to the rabbits' needs. That means:

- rabbit adequate size of area and density of animals
- quality of floor with possibilities of adequate motion and resting behaviour
- functional areas
- social contacts to conspecifics
- possibility of occupation with roughage and wood

Under these conditions the tested housing systems for rabbits show with respect to animal welfare a practicable alternative to the conventional cage housing systems.

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