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Setting of feeders, waterers and nest-boxes in two-floor cages for animal welfare

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Abstract

Best setting of feeders, drinkers and nest-boxes in a two-floor cage for rabbit welfare were studied. Trials were performed with does conditioned for three days in the lower floor and with does free to occupy both floors from the beginning of the experiment.

When does were conditioned, mean daily feed consumption was 85.2±38.3 g vs. 172.6±24.0 g, respectively in the upper and in the lower feeders ($P<0.05$). Mean daily water consumption was 174.7±93.9 g vs. 449.5±123.0 g, respectively in the upper and in the lower drinkers ($P<0.05$). Parturition was normally done in the lower floor (92.5%; $P<0.001$).

Unconditioned does utilised feeders and drinkers on both floors. When does were firstly introduced in the upper floor, feed consumption was 101.4±73.7 and 109.7±66.3 respectively in the upper and lower feeder; water consumption was 318.6±158.8 and 360.6±228.6, respectively in the upper and lower drinker. When does were firstly introduced in the lower floor, feed consumption was 133.5±53.8 and 58.5±52.3, respectively in the upper and lower feeder; water consumption was 276.2±148.2 and 389.8±178.8, respectively in the upper and lower drinker. All the differences were not significant. The unconditioned does chose the lower next box, except one.

Results complete the information necessary to build functional two-floor cages. Conditioning the does in the lower floor for three days, and setting feeders, drinkers and nest-boxes in the same level, satisfies the needs of management and is corresponding or not contrasting with animal ethology.

Introduction

The actual sensibility for animal welfare (María, 1996) makes it possible the promulgation of laws asking for a wider walking place available for rabbits raised in the industrial farms (UK Ministry of Agric., 1988; Italian D.L., 1992; Gamberini, 1999). This should be a factor able to decrease excessively the profitability of farms, and survival itself of industrial units could be endangered.

To solve in advance this problem, it was projected a two-floor cage, able to increase by 74-78% the walking surface, maintaining unchanged the base area of the cage. Trials were performed after a three days period during which the does were maintained in the lower floor, in order to oblige them to choose a place where to make their drops. The passage to the upper floor was then opened. This was done to keep clean the upper floor, since rabbits, according to their ethology, maintain the place they firstly chose to makes drops (Finzi, 1994).

Rabbits walked or sat on both floors, showing different individual characteristics. The difference in presence time (54% in the lower part vs. 46% in the upper one, as a mean) was not significant (Finzi et al., 1996), showing that rabbits properly utilise both floors of the cage.

It was then projected to test the behaviour of the animals to identify the best setting of feeders, drinkers and nest-boxes. The behaviour of does was tested both, when they were able to choose freely from the beginning, or after a conditioning period in the lower floor.

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Material and methods

Three two-floor cages, according to the original prototype, were utilised (Fig. 1). They were placed in the open air and sheltered by a roof. Feeders, drinkers and nest-boxes were set in correspondence of both floors. Feed was a commercial diet and was weighed every two days. A drip drinker served by a container furnished the water. The container was also weighed every two days and water consumption was calculated by difference.

Rabbits were a wild fur type 70% N.Z.W. strain, selected for open air breeding, named "Leprino di Viterbo" (Finzi et al., 1997). Two trials were performed in the period from August to December 1999.

In the first trial rabbits were conditioned, closing them in the lower floor for three days before opening the passage to the upper one. Ten nulliparous does were utilised. The preference was calculated as feed or water consumption over an 8 days period. Measurements began after three days to avoid the stress period of adaptation to a new environment (Verità and Finzi, 1980). Choosing of nest-box was tested on 14 does (7 nulliparous+7 multiparous) up to a total of 27 deliveries. They were introduced in the lower floor 11 days before parturition. The passage to the upper floor was opened after the conditioning period of three days.

A second trial was performed with 14 unconditioned multiparous does immediately free to accede to both floors. Seven subjects were firstly introduced in the upper floor and seven in the lower one. Feed and water consumption was tested. To begin to test the nest box preference, 7 multiparous does were utilised. Four does were firstly introduced in the upper floor and three in the lower one.

Analysis of variance was performed for feed and water consumption and a c^2 test for nesting place (SPSS, 1991).

Results and discussion

In the first trial, when does were conditioned, both feeders were utilised by the animals. Mean daily feed consumption was 85.2±38.3 g vs. 172.6±24.0 g, respectively in the upper and in the lower feeders. The observed difference (+87.4 g; +102.6%) was significant ($P<0.05$). Notwithstanding the relevant variability among subjects as indicated by the high S.D. Results indicate that the more convenient disposition of feeders is in correspondence of the lower floor.

The same was observed with reference to water consumption (174.7±93.9 g vs. 449.5±123.0 g, respectively in the upper and the lower drinkers), but the preference for the lower drinkers (+274.8 g; +157.3%) was still more marked. The difference was significant ($P<0.05$), notwithstanding the variability among subjects was again very high.

The difference in preferring the lower part reached a maximum with reference to the place chosen for parturition. The parturition percentage in the lower nest-box was 92.5% ($P<0.001$).

In the second trial with unconditioned does, when does were firstly introduced in the upper floor (fig. 2), daily feed consumption was practically the same in the upper and lower feeder (101.4±73.7 vs. 109.7±66.3). When does were firstly introduced in the lower floor (fig. 3), feed consumption was 133.5±53.8 in the upper feeder vs. 58.5±52.3 in the lower one. The high difference (128.2%) was not significant due the variability of individual behaviour.

Nevertheless a tendency to prefer the lower feeder when the animals were firstly introduced in the upper floor and vice versa can be observed. Data are not sufficient to apply a c^2 test to verify such hypothesis.

With reference to water, when does were firstly introduced in the upper floor (fig. 4), daily consumption was rather similar in the upper and lower drinker (318.6±158.8 vs. 360.6±228.6). When does were firstly introduced in the lower floor, water consumption was 276.2±148.2 in the upper drinker vs. 389.8±178.8 in the lower one (fig. 5). In both cases mean consumption was higher in the lower drinkers but differences were not significant. In many instances the tendency was to drink more at the same floor where the animals eat more, but some odd occurrences, difficult to be explained, were observed. For instance subjects 12 and 13 eat preferably in the upper floor but they prefer to drink in the lower one.

The nearly constant preference for the lower nest-box, observed with conditioned does, was confirmed when does were not conditioned. The observed proportion was six to one. The latter, firstly introduced in the lower floor, chose to kindle in the upper next-box.

The effect of individuality was more evident in the second trial as can be deduced comparing the values of standard deviation. As a consequence the result obtained in the first trial must be interpreted as an effect of conditioning. This plays a role in favour of the practice based on a three days period of conditioning in the lower floor that should be anyhow to be adopted as a rule of management. This choice is not in contrast with the mean behaviour of the animals if they are firstly introduced in the upper floor.

ConclusionS

As a conclusion, when rabbits are not conditioned, feeders and drinkers could be disposed indifferently in correspondence of the lower or the upper floor. But a short period of conditioning in the lower part should be a rule of management to oblige the animals to chose a place where to deposit their drops in order to maintain clean the upper part. Considering this managerial need, the lower floor becomes the best place to dispose feeders, drinkers and nests-boxes. It is preferred by the animals after conditioning and frequently chosen also by unconditioned does.

All the structural traits are thus defined to build up completely equipped two-floor cages. In this way it should not be necessary to increase the base surfaces, reducing the number of does present in a building, if new laws are emitted to ensure larger floor surfaces for rabbit welfare. But the structure is so functional, relatively simple and moderately increasing the cage building cost that it could be adapted for new units to take care of animal welfare even in absence of compulsory rules.

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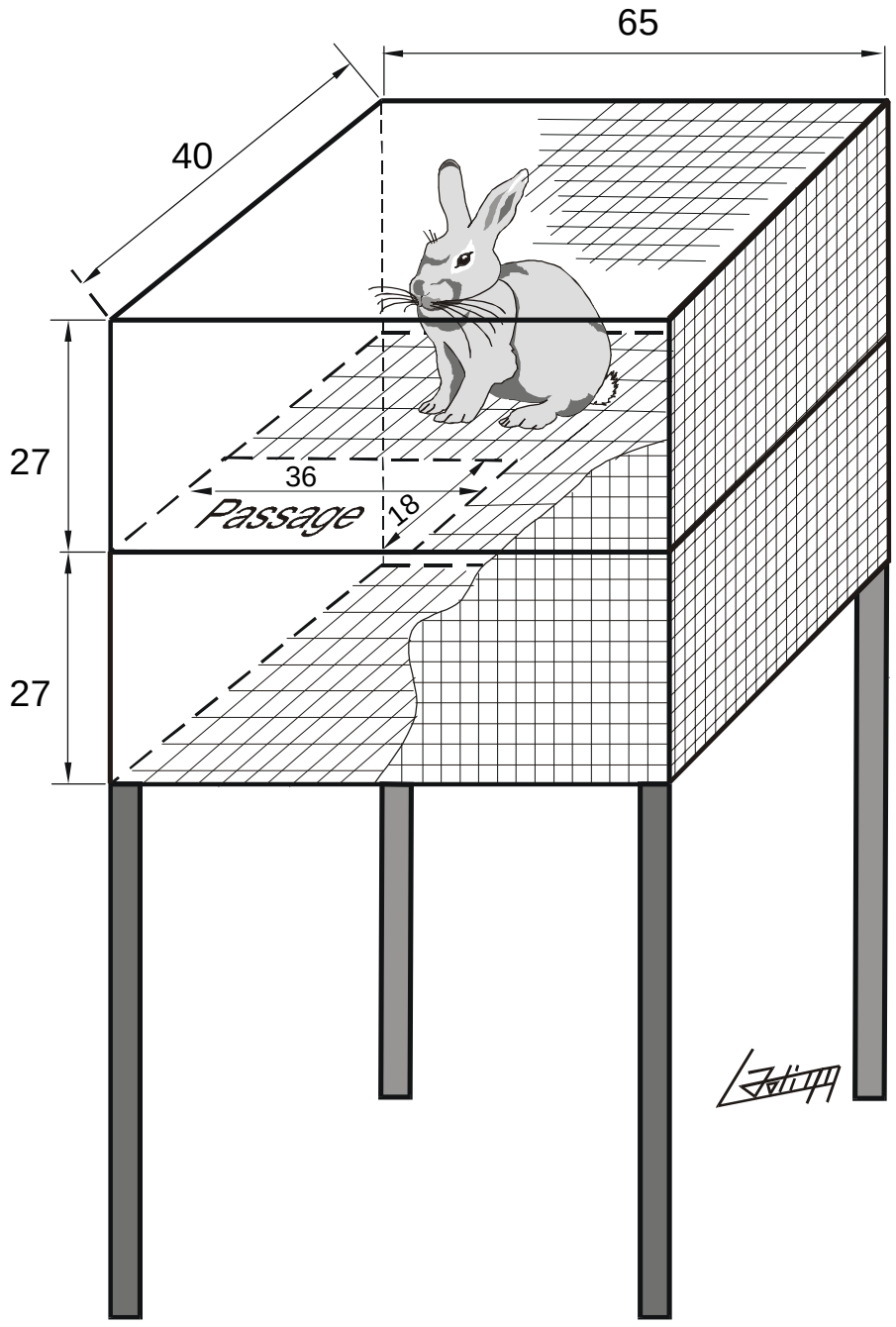

Fig. 1. Model of a two-floor cage for rabbit welfare.

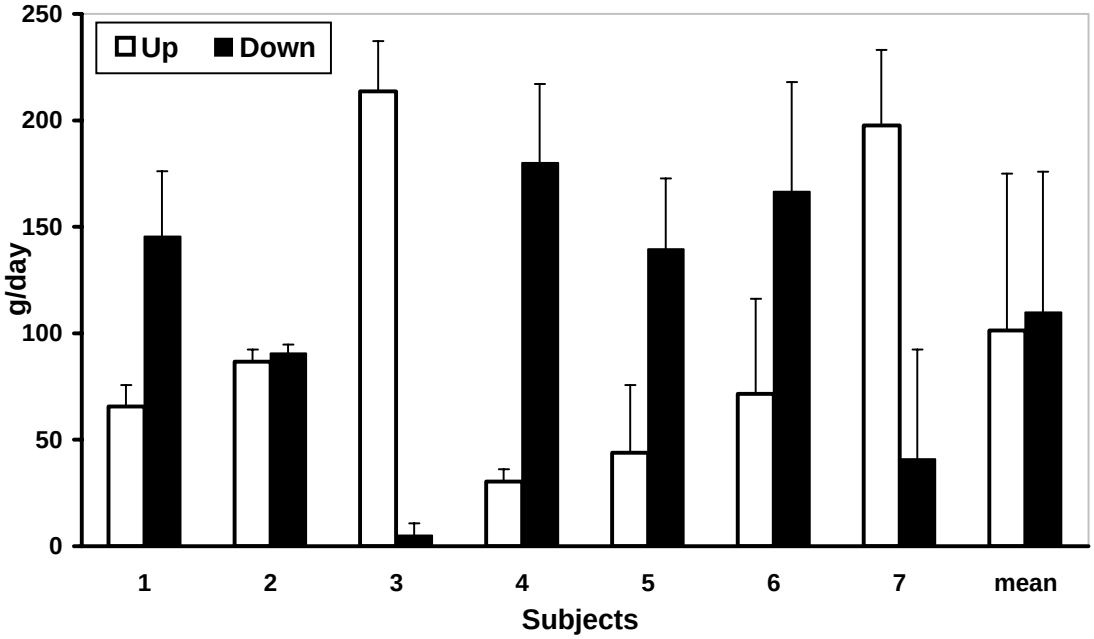

Fig. 2. Effect of individuality on the choice of feeding place, measured as feed consumption per day (mean ± SD) when does were firstly introduced in the upper floor.

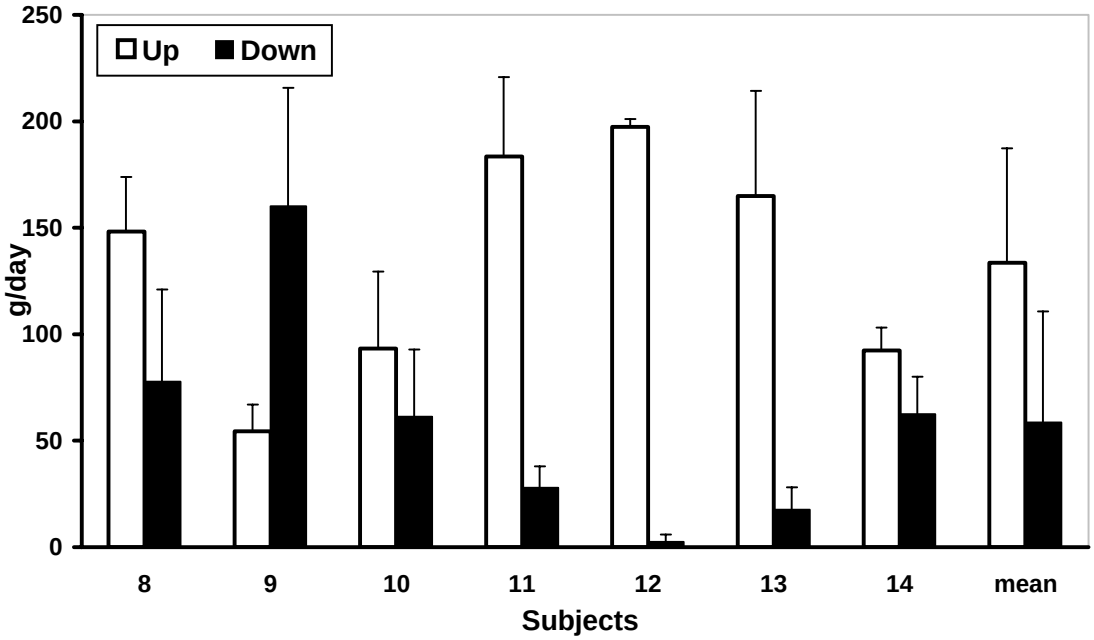

Fig. 3. Effect of individuality on the choice of feeding place, measured as feed consumption per day (mean ± SD) when does were firstly introduced in the lower floor.

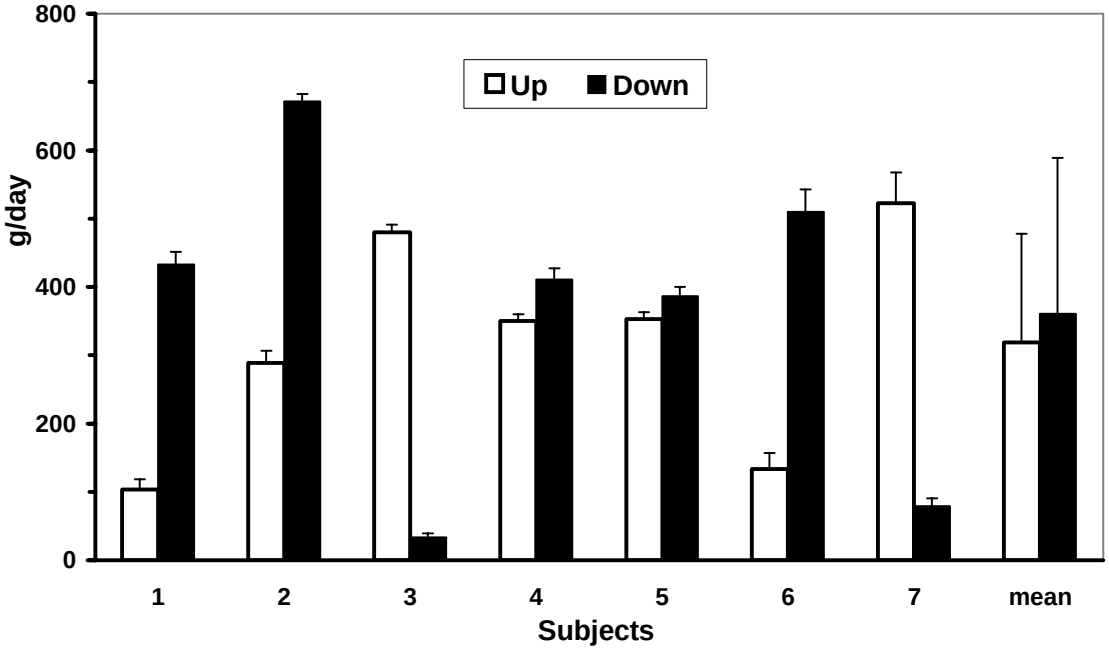

Fig. 4. Effect of individuality on the choice of drinking place, measured as water consumption per day (mean ± SD) when does were firstly introduced in the upper floor.

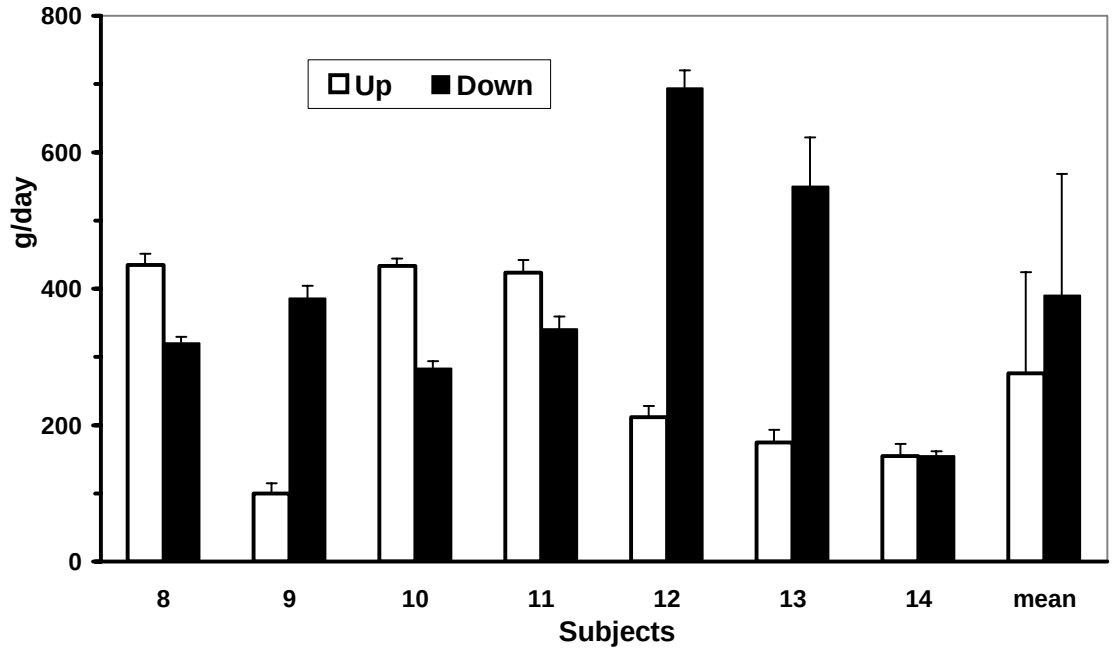

Fig. 5. Effect of individuality on the choice of drinking place, measured as water consumption per day (mean ± SD) when does were firstly introduced in the lower floor.