

A NEW ALTERNATIVE OUTDOOR HOUSING METHOD (WELLAP®) FOR FATTENING RABBITS: BEHAVIOR AND SPACE USE

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ABSTRACT

Animal welfare has become a very important topic for animal production, including rabbits. A new project for alternative housing system, named Wellap®, has been set with several elements: behavior, feeding, know-how on farming and building. The aim of the present trial is to characterize the behavior of rabbits, housed in pens, having free access to the outside 24/24 h, 7/7 d, and exposed only to natural light. Half of the pens (n=3 pens of 50 rabbits per group, 4 m² inside and 8 m² outside) contained dusty wood chips and the other half (n=3) contained duck board on the entire surface of the inside pen. Pens were enriched with gnawing blocks and double-level platforms. Video-recordings were made every day, for 30 minutes at 3:00 am, 7:30 am, 12:30 pm, 06:00 pm and 11:00 pm. Then, the number of rabbits outside was assessed as well as some behaviors of rabbits (interactions, number of straightened rabbits, action of gnawing). An adaptation period to their new environment, the separation from the doe and the presence of others congeners was observed and lasted 10 days. The average percentage of rabbits outside was 13%, and rabbits went outside more during the day. There was no effect of the floor type inside the pen on the number of rabbits outside. It seems that rabbits accessed the outdoor area more when inside temperature increased, whereas there was no relationship between humidity and the number of rabbits outside. The interactions among rabbits were distributed throughout the day. The highest number of straightened rabbits was recorded at 3:00 am and at 11:00 p.m. possibly linked to a vigilance behavior. The action of gnawing the blocks was very low at 6:00 pm and 12:30 pm, likely because this was just after the distribution of the feed and rabbits were no longer hungry, so they didn't gnaw. These results are the first evaluating the space use of rabbits and their behavior in the Wellap® concept, where rabbits are free to go out when they want.

Key words: Animal welfare, animal behavior, alternative housing, pens, fattening rabbits

INTRODUCTION

Animal welfare has become a very important theme for animal production, including rabbits. In 2017, the European parliament questioned the current rabbit farming conditions. The parliament, following the requests of the welfarist NGOs, wants breeders to gradually abandon the cages and replace them with alternative solutions. Studies have been published on fattening of rabbits in pens. Housing in pens can sometimes degrade health status when the density is too high and sometimes even alter the growth performance of fattening rabbits, but also allows to develop a more complete behavioral pattern (Maertens et al., 2011; Szendrő and Dalle Zotte, 2011; Trocino et al., 2014).

There is a need today to develop alternative housing systems which could further improve animal welfare, especially by environmental enrichment, and which also meets consumer demands. WISIUM and NEOVIA are working together on a new alternative housing systems project, called Wellap®, which includes several elements: behavior, feeding, know-how on farming and building. The aim of this trial is to characterize the space use and behavior of rabbits, housed in pens and having free access to the outside in the Wellap® system.

MATERIALS AND METHODS

Animals and experimental design

The trial was conducted at the NEOVIA research station located in Saint Nolff (France, 56) between April 16 and May 28, 2019. A total of 300 rabbits, Hyplus PS19xPS59, were weaned at 35 days of age and allocated in 6 pens according to their body weight one day before weaning in order to minimize the difference in average live weight between the 6 pens. A commercial feed (calculated values: 2230 kcal digestible energy/kg; 15.0% crude protein, 3.2% crude fat, 20.0% crude fiber) containing a coccidiostat (Diclazuril, 1 ppm) and 1% of polyphenol extract (Cassanova, Wisium, Saint Nolff, France) was distributed after weaning, and all rabbits were submitted to feed restriction (100, 120, 134, 150 and 170 g/day during the 5 weeks of the trial). Feed was distributed at 4:00 pm. Rabbits had free access to water.

Housing

The building contained 6 pens, each with an interior part and an exterior part. The floor area of each pen was 4 m² inside and 8 m² outside. The inside area was heated during the first week (20°C). Rabbits (50 rabbits per pen) were exposed only to natural light, except during measurements (e.g. recordings of body weight) to make the work of the animal caretakers easier. All pens contained PVC pipes outside, in which rabbits could hide. The outside floor was made of concrete and swept once a week to remove feces. In the inside area, half of the pens contained dusty wood chips and the other half contained duck board on the entire surface of the pen. Wood chips were added if necessary, but they were not removed until the end of the trial. There was no cleaning under the duck board. In each of the 6 pens, a double-level square platform (1 m²) was placed inside, so as to offer the rabbits the opportunity to jump and hide. In each pen, one drinker and two feeders were placed inside. Two gnawing blocks (1 kg Lapety Bloc Fourrage, Wisium, Saint Nolff, France: 80% of alfalfa and straw) were placed in cages, one inside and one outside. Outside access was open 24/24 h, rabbits were free to go in and out when they want. Cameras were installed on 4 of the 6 pens in order to evaluate the behavior of rabbits.

Controls and measures

Video-recordings were made every day, 5 sequences of 30 minutes at 3:00 am, 7:30 am, 12:30 pm, 06:00 pm and 11:00 pm. For each of the 4 pens, two night vision cameras were installed: one inside, the other outside. Viewing and recording of films was done using FOSCAM (Shenzhen, China) equipment, i.e. software, online surveillance video recording and storage software. The cameras filmed the rabbits without distinction, this was a global and not individual follow-up. The number of rabbits outside was assessed by the "scan sampling" method using video recordings. "Print screens" were done every 3 minutes on 30-minute slots. Animal counts were only carried out outdoors. The behavior of animals outdoors was assessed using the method of "scan sampling and behavior sampling" through video recordings. The recordings were viewed for 1 minute with 2-minute intervals on 30-minute slots over the entire period of the trial. The behaviors were divided into 3 categories.

Interactive: actions between at least 2 rabbits which exert on each other or reciprocally one or more actions: contact, toilet, sniffing and/or fight. *Straightening up*: action of standing on its hind legs and raising its front legs (whether or not resting on a support). *Gnawing*: use of the gnawing block provided outside.

These data were not statistically analyzed, because there were only 2 repetitions per group. Data were represented in scatter plot to evaluate the presence of relationship between factors and number of rabbits outside.

RESULTS AND DISCUSSION

Data about sanitary status and growth performances are presented by Guené et al., 2021.

Space use

It is recognized, that an adaptation period is necessary for animals after weaning (Gidenne, 2015): rabbits need to adapt to a new environment, the separation from the doe and the presence of others congeners. In this trial, an adaptation period of 10 days was observed. This period was not comparable to the rest of the trial, consisting in 7 days during which inside pens were heated followed by 3 days of adaptation to the new environmental conditions. The data registered during this period were thus not analyzed.

The average percentage of rabbits outside in the four pens was 13%. This is not very high, and it is impossible to know if rabbits all went out or if always the same rabbits went outside. This issue is worth of further investigation.

Rabbits housed in pens with wood chips went out more than rabbits housed in pens with duck board, as shown in Table 1. This observation is consistent with the results of Guené et al. (2021) and could be explained by the fact that the inside floor became uncomfortable because of the urine (Matics et al., 2003). Rabbits went outside more during the day than the night, with a maximum at 6:00 pm. The difference observed with the results in the article of Guené et al. (2021), in which rabbits went out the most at 8:00 am, could be attributed to the presence of the operator recording the data in the first study, interfering with their natural behavior.

Table 1: Percentage of rabbits outdoor according to the time of the day from 46 to 70 d of age.

| Time of observation | Inside pens with duck board | Inside pens with wood chips |
|---------------------|-----------------------------|-----------------------------|
| 3:00 AM | 2% | 6% |
| 7:30 AM | 14% | 18% |
| 12:30 PM | 12% | 15% |
| 6:00 PM | 19% | 28% |
| 11:00 PM | 6% | 13% |

Several factors can have an impact on the number of rabbits outside: indoor and outdoor temperature, indoor and outdoor humidity, wind speed, the dew point, atmospheric pressure, rainfall; their impact has been evaluated by the regressions given in Figure 1.

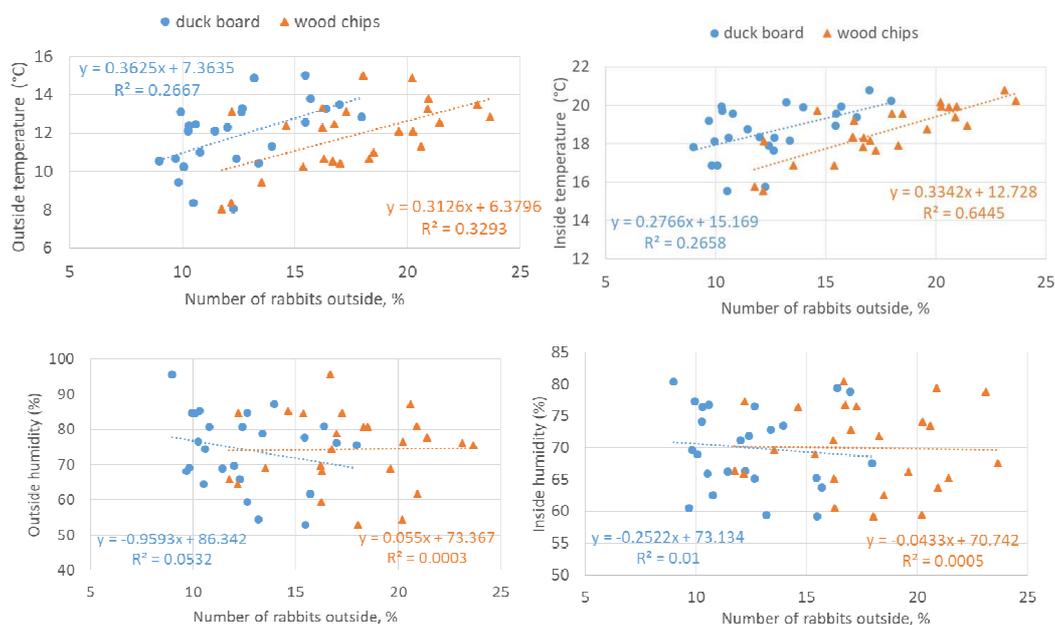


Figure 1: Relationship between inside or outside temperature/humidity and number of rabbits in the outside area for pens with wood chips and pens with duck board.

In figure 1, The slopes of the data referring to inside or outside temperatures were very similar between the two kinds of pens and there was no effect of the floor type. R^2 for correlations between outside temperature and number of rabbits outside were low. It seems that rabbits came out more when the inside temperature was high, in particular for rabbits housed in pens with wood chips, for which the R^2 is higher. Regarding humidity, there was no correlation with the number of rabbit outside. About wind speed, dew

point, atmospheric pressure and rainfall, R^2 were less than 0.07 (data not shown), meaning the absence of relationships with the number of rabbit outside.

Animal behavior

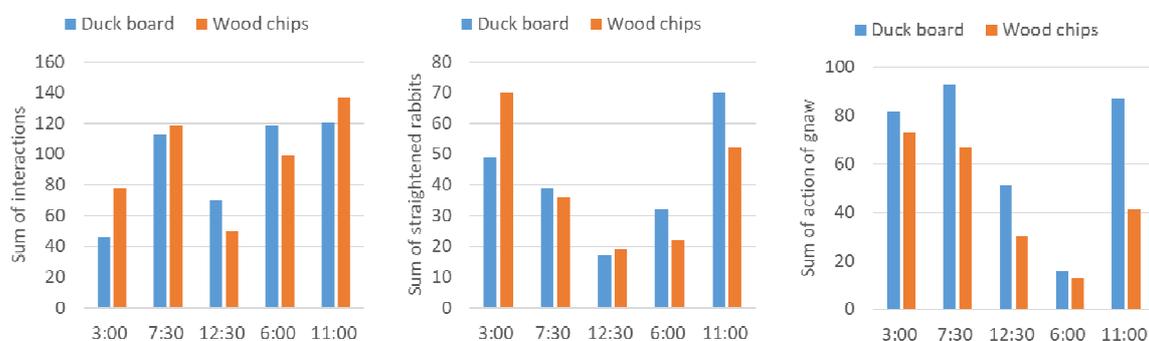


Figure 2: Interaction, straightened rabbits and action of gnaw depending on the time of day

Figure 2 presents the distribution of the different actions at different times of the day. The interactions among rabbits were distributed throughout the day, with higher values at 7:30 am, 6:00 pm and 11:00 pm compared to those at 3:00 am and 12:30 pm. The number of straightened rabbits was highest at 3:00 am and at 11:00 p.m. This behavior could be linked to a certain vigilance at these hours, to watch the environment and warn about a possible danger. The action of gnawing the block was very low at 6:00 pm and 12:30 pm, likely because this was just after the distribution of the feed and rabbits were no longer hungry.

CONCLUSIONS

In this trial, after an adaptation period of 10 days, rabbits tended to go out with the increase of inside temperature. Surprisingly, no relationship was found between humidity and behavior of rabbits. More data on a higher number of pens will be necessary to confirm and clarify relationships between environmental factors and rabbits behavior.

ACKNOWLEDGEMENTS

The authors also would like to thank all the participants of the *Wisium Prospective Club* for their investment in this project, and Sophie Balland for her help in analyzing the video data.

REFERENCES

- Gidenne T., Lebas F., Savietto D., Dorchies P., Duperray J., Davoust C., Fortun-Lamothe L. Le lapin De la biologie à l'élevage. 2015. Versailles : Edition Quae, 288p, ISBN 978-2-7592-2416-6, reference 02512.
- Guené E., Davoust C., Launay C., 2021. A new alternative outdoor housing method (WELLAP®) for fattening rabbits: first results. *In Proc. 12th World Rabbit Congress, Nantes, France, 23-25 June.*
- Maertens L., Rommers J., Jacquet M. 2011. Le logement des lapins en parcs, une alternative pour les cages classiques dans un système "duo"? *In Proc. 14èmes Journ. Rech. Cunicole, Le Mans, France, 22-23 novembre. 85-88.*
- Matics Zs., Szendrő Zs., Radnai I., Biró-Németh E., Gyovai M. 2003. Examination of free choice of rabbits among different sages-floors. *Agric. Conspectus Sci.*, 68, 265–268.
- Szendrő Zs., Dalle Zotte A., 2011. Effect of housing conditions on production and behaviour of growing meat rabbits: A review. *Livestock Sci.*, 37, 296-303.
- Trocino A., Filiou E., Tazzoli M., Bertotto D., Negrato E., Xiccato G., 2014. Behaviour and welfare of growing rabbits housed in cages and pens. *Livestock Sci.*, 167, 305–314.