

## **A NEW ALTERNATIVE OUTDOOR HOUSING METHOD (WELLAP®) FOR FATTENING RABBITS: FIRST RESULTS**

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### **ABSTRACT**

Animal welfare has become a very important theme 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 focused on 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, 4m<sup>2</sup> inside and 8m<sup>2</sup> outside,) contained dusty wood chips and the other half contained duck board on the entire surface of the inside pen. Pens were enriched with gnawing blocks and double-level platform. Sanitary status, intake of gnawing blocks were recorded and behavior of rabbits was evaluated 3 times a day, 5 d/7 during the whole period of fattening. Rabbits were fed restricted during the fattening period (100, 120, 134, 150 and 170 g/day for the 5 weeks of the trial). At the end of the trial, the sanitary status was better for rabbits from the pens with duck board compared to pens with wood chips; 0 dead vs. 4 respectively (p=0.04). The percentage of rabbits outside was 30% of the total at 8:30 in the morning; 4.9% at 11:00 am, and 15.6% at 3:00 pm. Growth performance are penalized by the very strict feed restriction (body weight at 70 days of age was 2.341 kg, lower than the Hyplus PS19xPS59 standard that mentions 2,560 kg) and by the feed which is deliberately not very energetic in order to secure the sanitary status. This very innovative system demonstrates that raising rabbits with access to the outside is possible, even if arrangements concerning feeding are necessary and are in progress.

**Key words:** Animal welfare, animal behavior, alternative housing, pen housing, 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 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 will 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 first trial is focused on the behavior of rabbits, housed in pens and having free access to the outside in a system named Wellap®. Growth performance and health status were recorded in order to study the impact of this new type of housing, but the first objective of this work remains the evaluation of animal behavior.

### **MATERIALS AND METHODS**

#### **Animals and experimental design**

The trial was conducted at the NEOVIA research station located in Saint Nolff (56) between April 16<sup>th</sup> and May 28<sup>th</sup>, 2019.

A total of 300 rabbits issued from Hyplus PS19xPS59 were weaned at 35 days of age. They were allocated in 6 pens according their body weight one day before weaning. A commercial feed (theoretical DE: 2230 kcal/kg, 15.0% protein, 3.2% fat and 20.0 % crude fiber) containing a coccidiostat (Diclazuril, 1 ppm) and

1% of polyphenol extract (Cassanova) was distributed after weaning, and all rabbits were fed restricted (100, 120, 134, 150 and 170 g/day for 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 case was 4 m<sup>2</sup> inside and 8 m<sup>2</sup> outside. The inside part was heated during the first week. Rabbits (50 rabbits per pen) were exposed only to natural light, except during measurements to facilitate the work of the animal keepers (body weight...). All pens contained PVC pipes outside, in which rabbits could hide. There outside floor was made of concrete. The outside soil was swept once a week to remove faeces.

In the inside part, two kinds of pens were studied: half of the pens contained dusty wood chips and the other half of pens contained duck board on the entire surface of the pen. Wood chips were added if necessary, but they were not removed during the whole trial. There was no cleaning under the duck board. In each of the 6 pens, a double-level platform (1m<sup>2</sup> square each) was placed inside, so as to offer the rabbits the opportunity to jump and hide. In each pens, one drinker and two feeders were placed inside. Two gnawing blocks (1 kg Lapety Bloc Fouflage: 80% of alfalfa and straw) were placed in cages, one inside and one outside. Access to outside was open 24/24 h, rabbits are free to go in and out when they want.

### **Controls and measures**

During the fattening period, morbidity control was performed on all animals each week. Mortality was recorded daily and the apparent causes of death were recorded. The intake of gnawing blocks was registered each week. Water intake was registered each day for the 6 pens. The number of rabbits placed outside was counted three times a day: 8:30 am, 1:00 pm and 3:30 pm, 5d/7. Precautions were taken to avoid rabbits behavior change by human presence. Rabbits live weight and pen feed intake were recorded each week between weaning and 70 days of age.

Mortality and morbidity were compared by a frequency comparison test (Chi<sup>2</sup>, Rstudio, version 1.2.5033). Growth performances are analyzed with RStudio software. The statistical model included the fixed effect of the kind of pens and the pen in random effect.

## **RESULTS AND DISCUSSION**

### **Sanitary Status**

A total of 4 rabbits died during the trial, all in the pens with wood chips. Mortality was significantly higher in pens with wood chips compared to pens with duck board (2.7% vs 0%, for wood chips and duck board respectively,  $p=0.04$ ). These results are consistent with the review of Szendrő et Dalle Zotte, 2011 who reported an increase of mortality with the use of deep litters. Morbidity (diarrhea and bloating) was not different between the two kinds of pens, but there were more sick rabbits in the pens containing the wood chips. In this trial, mortality and morbidity were low, thus it is difficult to clearly conclude according to the kind of pens.

### **Gnawing blocks intake**

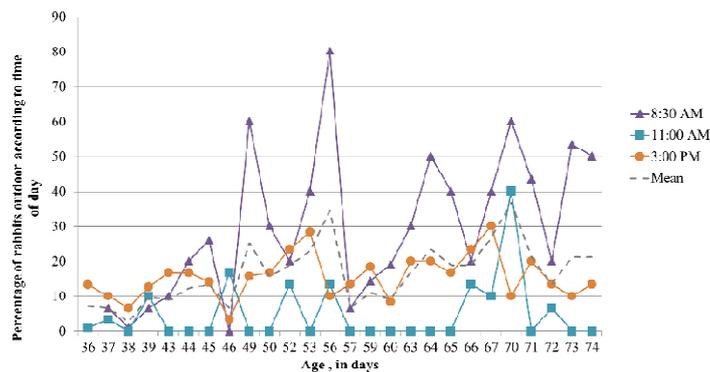
In the two kinds of pens, rabbits gnaw on blocks as shown by the intake presented in Table 1. Rabbits ate in average 0.740 g/ day / rabbit of gnawing block. This kind of enrichment is beneficial for rabbits, because it is known to reduce the stereotypies (gnawing the bars of the cage) and aggressive behaviors (Princz et al., 2007). There was no difference between the two kinds of pens. These observations could indicate a better satisfaction of the behavioral needs for the enriched caged rabbits.

**Table 1:** Gnawing blocks intake

g/day/rabbit	Wood chips		Duck board		Prob.
	Mean	SD	Mean	SD	
35-43 d	0.491	0.223	0.457	0.119	NS
43-49 d	0.719	0.225	0.444	0.063	NS
49-56 d	0.882	0.411	0.587	0.117	NS
56-63 d	1.738	0	0.992	0.698	NS
63-70 d	0.984	0.454	1.101	0.481	NS
35-70 d	0.789	0.283	0.691	0.039	NS

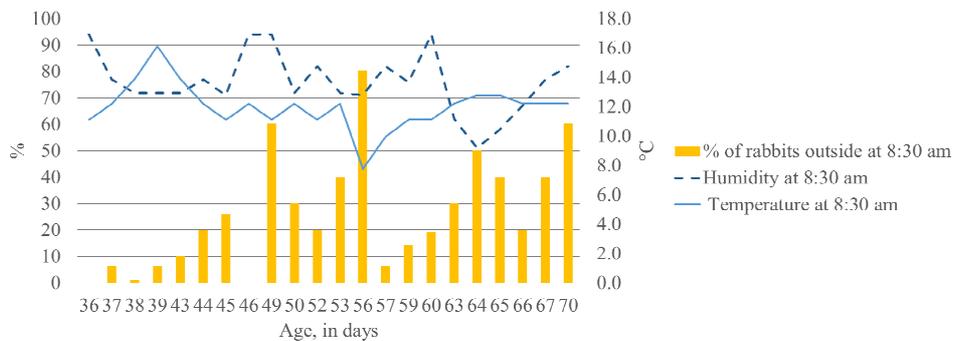
### Use of outdoor and indoor areas

The Figure 1 shows the percentage of rabbit in the outside area during the week (all pens combined). The rabbits go outside rather in the morning at 8:30 a.m. (30% of total rabbits were outside) than at 11 a.m. (4.9%) or 3:30 p.m. (15.6%). Throughout the trial, the percentage of rabbits in the outdoor area increased with age. The percentage of rabbits outside regarding the kind of pen was not registered. It could be imagined rabbits from pens with wood chips go outside more which would be consistent with the work of Matics et al., 2003, in which they observed the soiled and wet (by urine) planked-floor was chosen by fewer and fewer rearing rabbits after the first week. A new trial must be performed to evaluate this hypothesis. During few days, the percentage of rabbits in the outdoor area was very low (give a range of low values).



**Figure 1:** Percentage of rabbits outdoor according to time of day during the trial (from 36 to 70 d of age), all pens combined.

A link between the percentage of rabbits outside at 8:30 am and the outdoor temperature or humidity was studied to try to understand why rabbits don't go out on these days (Figure 2). There was no link between these two parameters and the behavior of rabbits, whatever the time of the day (data at 11:00 am and 3:00 pm not presented, no link either).



**Figure 2:** Percentage of rabbits outdoor at 8:30 am according to outside temperature and humidity during the trial (from 36 to 70 d of age), all pens combined.

### Growth performances

Rabbits weighted 1,100 kg at weaning and 2,341 kg at 70 days of age (Table 2). This last data is below the Hyplus PS19xPS59 standard, i.e. 2,560 kg at 70 days of age. The live body weight was penalized by the very strict feed restriction and by the feed which had deliberately a low-energy content to guarantee animal health. We can also hypothesize that the energy expenditure was greater since the living space was larger. No difference was recorded according to the pen kind. In this trial, rabbits were fed restricted, thus, the feed intake was not different between the 2 kinds of pens. The ratio water/feed intake was interesting to evaluate to see if this new type of housing had an effect on eating behavior of animals. From 35 to 70 days of age, the water intake was 293.4 ml/rabbit/day, thus the ratio water/feed intake was 2.16, which is

not so far from the commonly calculated ratio of 2. This kind of housing did not modify the eating behavior of animals.

**Table 2:** Growth performances of rabbits regarding the kind of the pen

	Wood chips		Duck board		Prob.
	mean	sd	mean	sd	
Body Weight 35 d, kg	1.100	0.067	1.101	0.068	NS
Body Weight 70 d, kg	2.322	0.217	2.360	0.196	NS
Average Daily Gain 35-70 d, g/d	29.1	5.1	30.0	5.4	NS
Feed intake 36-70 d, g/d	135.8	0.0	135.8	0.0	NS
Feed Conversion Ratio	4.67	0.09	4.53	0.032	0.05

Body weight and Average Daily Gain are calculated from individual data (n=50 rabbits per pen at day 35). Feed intake and Feed Conversion Ratio are calculated from pen data (n=3 per pen).

## CONCLUSIONS

In this trial, even if morbidity and mortality were low, the pens with duck board allow a better sanitary status, potentially by avoiding contact between faeces and rabbits. This trial is the first in this thematic, it demonstrates that raising rabbits in a new type of housing with access to the outside and exposed only to natural light is possible, even if arrangements concerning feeding are necessary and are in progress.

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