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## ARE PRE-WEANING HEALTH PROBLEMS TRANSFERRED TO LATER PHASES IN PARC HOUSED MEAT RABBITS?

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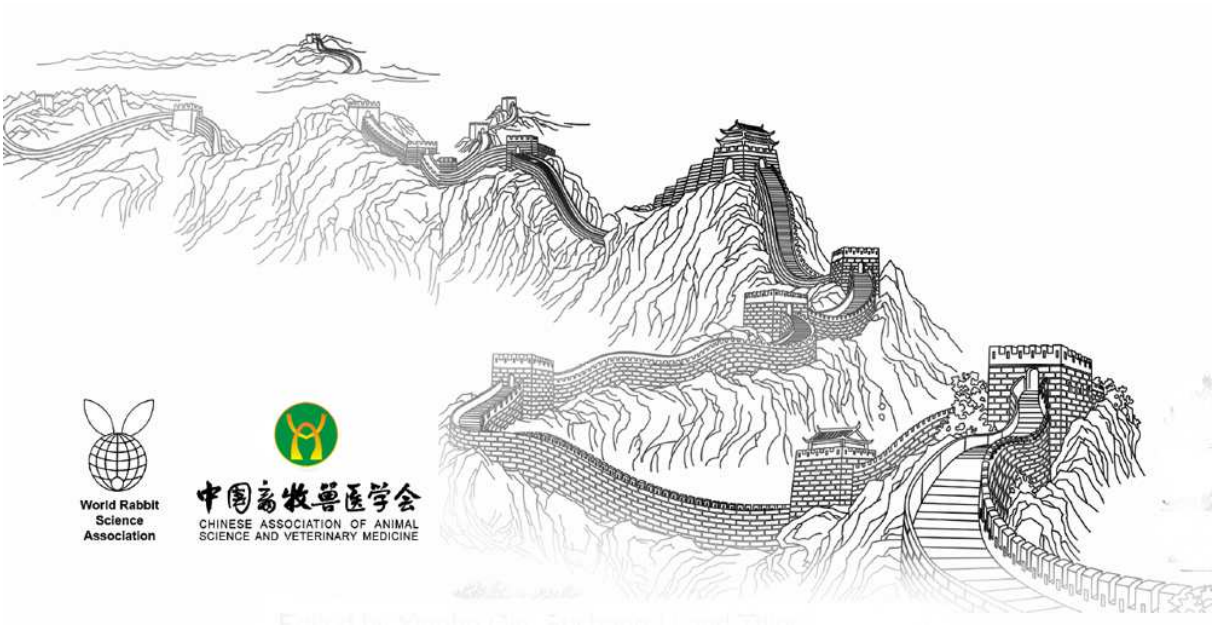

# ARE PRE-WEANING HEALTH PROBLEMS TRANSFERRED TO LATER PHASES IN PARC HOUSED MEAT RABBITS?

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## ABSTRACT

The development of housing meat rabbits in larger groups ('parcs') implies mixing of litters. From a microbial/epidemiological point of view, this may affect health performance. Therefore an experiment was conducted with the aim to test whether healthy rabbits from nests with health problems early in life affect their parc mates during the fattening phase. Litters from hybrid (HYLA) rabbit does were characterised at weaning on mortality and culling rate. At weaning, litters were classified as good (visibly healthy) when culling rate was ≤ 15% and ≤ 2 kits were removed. Litters were classified as poor when culling rate was ≥ 40% or ≥ 4 kits removed at weaning. Only the visibly healthy kits were used in the experiment, all other kits were excluded. At weaning, kits from good litters were housed in parcs. To half of the parcs, 4 to 5 healthy kits from of poor nests were added (Challenge group). To the other half of the parcs 4 to 5 healthy kits from good nests were added (Control group). Mortality and day of death were recorded until delivery to the slaughter plant at 11 weeks of age. Loss days were calculated as the cumulative number of days that culled rabbits in a parc had been housed in the pen, divided by the number of rabbits places per parc. Overall mortality rate was high (9.6%). No effect in mortality or loss days was found between the parcs were kits from poor or good litters had been added. However, the animals from poor nests themselves had more lost days (6.9 vs 1.9 for poor vs good kits, p=0.02). Although not significant, these rabbits also showed a higher mortality compared to rabbit from good nests (14.3% vs 6.5%). From this experiment it can be concluded that visible healthy kits from poor nests differ from those from healthy nests. In this experiment, they did not affect mortality rate of the good kits in the parc. However overall mortality was high and may have masked the effect. The experiment needs and deserves repetition under better health conditions.

**Keywords:** meat rabbits, parcs, large groups, mixing, mortality, pathogen spread

## INTRODUCTION

Housing of rabbits in so called "parcs" (large collective pens) is seen as an improvement for animal welfare due to better meeting the behavioural needs of the animals. For that reason, retail in Belgium is now demanding meat from rabbits housed in parcs. Most Dutch rabbits are slaughtered in Belgium, and the Dutch sector is now rapidly switching to the parc housing system. Currently (early 2016), it is estimated that about 60% of the meat rabbits are housed in parcs (Dutch rabbit sector, personal communication). Meat rabbits housed in parcs show lower slaughter weights compared to those from conventional housing (Maertens and Buijs, 2015; Matics et al., 2014; Xiccato et al., 2013) and several farmers complain about more health problems compared to litter based housing in welfare cage (Dutch rabbit sector, personal communication). The higher spread of pathogens due to mixing of litters is a mechanism that is thought to contribute to this problem.

An experiment was performed which tested whether health issues pre-weaning are related to health performance after weaning. This was performed by testing whether healthy animals from nests with pre-weaning problems have a negative impact on their parc mates after weaning.

## MATERIALS AND METHODS

### Housing and management

After weaning kits from hybrid (Hyla) does were housed in parcs. Two types of parcs were used, namely: Menenghin and Van Eck parcs. Twenty-two Menenghin parcs were used, containing 38 rabbits each. Twenty Van Eck parcs were used. In 16 Van Eck parcs 47 rabbits were housed per parc, in four smaller Van Eck parcs 32 rabbits were housed. Stocking density was 800cm$^2$ per rabbit in al parcs.

The Menenghin parcs had a dimension of 2.14 x 1 m (length x width) and the Van Eck parcs measured 2.15 x 1.14 m (length x width). Both parc types were open at the top. In both parc types, there was a platform of 42 cm (Menenghin) or 50 cm (Van Eck) width over the total length of the parcs. Underneath the platform, there were two plastic shelter pipes with a diameter of 15 cm. In both parc types kits had access to three feeders, four drinking nipples and a wooden gnawing stick. The Van Eck parc had a plastic slatted floor, whereas the Menenghin parc had a plastic slatted floor for 80% of the cage floor. The additional floor surface was made out of galvanized wire.

To prevent digestive problems, the commercial pelleted food for fatteners was fed restrictedly according to the management practice at the farm. Rabbits got access to the feeder for 12 hours a day (from 15.00-3.00 hours). Water was given ad libitum by drinking nipples. Rabbits were kept in the dark; lights were put on only for management activities and control of the animals. The experiment ended when rabbits reached slaughter age (11 weeks of age).

### Treatment groups

At 35 days of age, kits that were extremely small or showed visible signs of disease according to the rabbit farmer were excluded from the experiment. Based on the mortality and culling rate, litters were scored as healthy (mortality ≤15% and number of kits culled ≤ 2 kits) or poor (mortality ≥ 40% and number of kits culled ≥ 4). Only visibly healthy kits from the poor litters were used in the experiment.

At weaning, parcs were filled with kits from the healthy litters. Half of each litter was placed in one parc and the other half in the opposite parc until 34 kits were placed in the Menenghin parcs and 42 kits were placed in the Van Eck parcs.
Accordingly, four (Menenghin) or five (Van Eck) visibly healthy kits from a poor litter were added to one parc (challenged group) and four (Menenghin) or five (Van Eck) visibly healthy kits from a good litter (control) were added to the opposite parc. These kits were marked with a colour spray. Treatments were alternately assigned to the parcs to standardize the effect of neighbouring cages.
Finally we had two different groups for each system:

1. Good kits added with healthy kits origining from good litters (Control),
2. Good kits added with healthy kits origining from poor litters (Challenged).

### Measurements

The number of died or culled rabbits was recorded daily. Registration included day of removal and whether died or culled animals belonged to the animals that were added to the group (coloured). Mortality and culling were recorded per parc.

### Data analysis

For each parc, the number of days that dead or culled rabbits were present in the parcs per animal place (the so called “loss days”) was calculated by cumulating the number of days that dead or culled rabbits had been present divided by the total number of rabbits at start.

Mortality/culling rate and loss days of the Control and Challenged groups were analysed using the GLM procedure from SAS 9.2 (SAS, 2002) with parc type (Menenghin , Van Eck) and treatmentgroup (Control, Challenged) as factors according to the following model: $y_{ij}$= u + $type_i$ + $treatment\ group_j$ + $(type*treatment\ group)_{ij}$ + $e_{ij}$where $Y_{ij}$ = dependent variable; u = overall mean; $type_i$ = parc type (i=

Meneghin and Van Eck); treatment group$_j$ = treatment group (j= Control and Challenged); (type*treatment)$_{ij}$ = interaction between type and treatment, and $e_{ii}$ is the residual error.

Also the mortality/culling rate and loss days of the marked rabbits that were added to the group (Control or Challenged) were analysed according to the above GLM procedure.

## RESULTS AND DISCUSSION

In the experiment the incidence of disease was high; therefore animals were treated with antibiotics in the drinking water in the first and fourth week after weaning.

Parc type (Meneghin versus Van Eck) had no detectable effect on mortality/culling rate and on loss days. Therefore the overall mortality/culling rate and number of loss days of the treatment groups are pooled for both parc systems and presented in Table 1. Major causes of death/culling were digestive disorders.

***Table 1**. Loss days and mortality and culling rate for the treatment groups (Control, Challenged)*

| Group | Control | Challenged | standard error | P-value |
|---|---|---|---|---|
| Number of parcs | 21 | 21 | | |
| Loss days | 4.0 | 4.1 | 0.6 | 0.46 |
| Mortality/Culling rate | 8.4 | 9.3 | 1.2 | 0.61 |

As shown in Table 1 the mortality & culling rate in this experiment was high. There were no significant differences in loss days or mortality & culling rate between the treatment groups. In Table 2 the loss days and mortality and culling rate are presented of the healthy and poor rabbits that were added to the groups.

***Table 2.** Loss days and mortality and culling rate of the added rabbits originating from healthy or poor litters. Healthy kits belonged to litters with ≤15% culling and ≤2 kits removed at weaning. Poor kits belonged to litters with ≥ 40% culling or ≥ 4 kits removed at weaning.*

| Group | Good | Poor | standard error | P-value |
|---|---|---|---|---|
| Number of parcs | 21 | 21 | | |
| Loss days | 1.9[a] | 6.9[b] | 1.6 | 0.02 |
| Mortality/Culling rate | 6.5 | 14.3 | 3.3 | 0.30 |

[ab] Means with a different letter in the same row differ significantly (P<0.05)

As shown in Table 2, the rabbits originating from poor litters had significant (P< 0.05) more loss days, mainly because mortality was higher at later age. Also, mortality/culling rate was numerically substantially higher, but this difference was not significant. The results indicate that, although visible healthy, kits from poor litters have a higher change to die from health problems.

The aim of our experiment was to study whether animals from diseased litters bare a risk for their litter mates after mixing. The idea behind this is that these kits that may carry (and spread) more pathogens, affecting the health of the other rabbits in a parc. This might explain the reported lower health performance of parc housed rabbits compared to conventionally housed meat rabbits. Therefore we created two treatment groups, based on the performances before weaning. The experimental set-up followed the regular management procedure at a farm, where sick or too small kits are not mixed with the other kits after weaning and excluded these kits from the experiment. Thus, effects from the added animals on other animals could origin from visibly healthy animals only.

Performance of weaned rabbits is dependent on many factors. It is likely that animals raised in litters with poor health performance have disadvantages from pathogen burden. This was tested in this experiment. Indeed, healthy kits from poor litters showed more loss days and a high mortality/culling

rate compared to rabbits belonging to healthy litters. The risk of dying during the fattening phase of healthy animals from diseased litters is more than double that of such animals from healthy litters. Furthermore, the age at which the animals from problem litters died during fattening is on average higher – implying a higher economic loss.

However, in this experiment we could not prove that these kits influenced the health performance of the other kits in the parc. The high overall disease incidence (also visualised in the high mortality/culling rate in this experiment) and the associated high medical treatments imposed may have masked the foreseen effect.

The experiment is conclusive in the fact that visibly healthy animals from poor litters carry disadvantages with them, resulting in higher mortality after weaning. Transfer of these health disadvantages to their parc mates was not observed. Presence of this effect is highly relevant for management practices such as mixing. The economic and welfare relevance of disease spread caused by mixing litters for parc housing justifies a repetition of the experiment, preferably under better health conditions.

## CONCLUSIONS

Kits being raised in litters with high mortality and/or high culling rate differ from kits raised in healthy litters; they had more loss days and a higher mortality/culling rate.

After weaning, poor kits did not affect mortality/culling rate of the other rabbits in the parc. However, the effect may have been masked by the high overall mortality in this experiment.

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# Are pre-weaning health problems transferred to later phases in parc housed meat rabbits?

Jorine Rommers and Karel de Greef

## Message

Background: Parc housing of meat rabbits is requested by the market in The Netherlands and to be obligatory in Belgium
Problem: increased health problems are reported from parc housed rabbits
Hypothesis: Parc housing includes mixing of litters at weaning
Visibly healthy kits from poor litters pre-weaning may be transferring pathogens into the parc?
Answer: Visibly healthy kits from problem nests don't affect mortality of the other kits in the parc, but they have a higher mortality rate from weaning to slaughtering themselves.

## Question raised

Are health issues pre-weaning related to health performance after weaning?

## Methods

- 1852 kits from hybrid multiparous Hyla does in a commercial farm
- Pre-weaning: kits housed with does in 'welfare cages'
- After weaning: kits were housed in parcs (see picture), 38 – 47 rabbits/parc (800 cm2/rabbit)
- Pre-weaning: scoring health status by mortality and culling rate at weaning
- ***Good*** litters: mortality ≤ 15% and ≤ 2 kits culled
- ***Poor*** litters: mortality ≥ 40% and ≥ 4 kits culled
- Only visibly healthy kits from poor litters were used after weaning!

Treatments:

- healthy kits added with healthy kits origining from good litters (Control)
- healthy kits added with healthy kits origining from poor litters (Challenged)

Parc housing system for meat rabbits.


Healthy vs poor kits at early age. Only healthy kits were used to test whether healthy kits from poor nests transfer pathogens during the fattening phase.

## Results

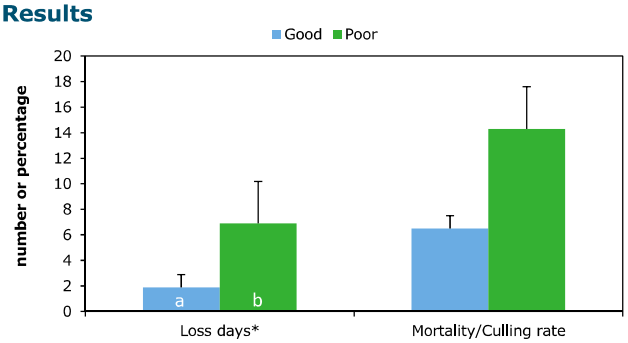


**Figure 1.** Loss days and mortality and culling rate of the added rabbits originating from healthy or poor litters (n=21). Healthy kits belonged to litters with ≤15% culling and ≤2 kits removed at weaning. Poor kits belonged to litters with ≥ 40% culling or ≥ 4 kits removed at weaning.
ab Means with a different letter differ significantly (P<0.05)
* Loss days= Σ number of days that dead or culled rabbits were in the parc/total number of rabbits at start

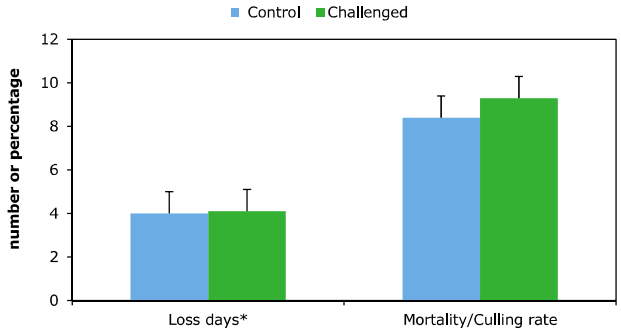


**Figure 2.** Loss days and mortality and culling rate for the treatment groups (Control, Challenged, n=21).
* Loss days= Σ number of days that dead or culled rabbits were in the parc/total number of rabbits at start

## Conclusions

- Visibly healthy kits from poor litters have worth health performance in later life
- But there is no proof that they affect mortality/culling rate of their parc mates

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