



# Masking odour when regrouping rabbit does: Effect on aggression, stress and lesions



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## ABSTRACT

Regrouping female rabbits (*Oryctolagus cuniculus*) in group housing systems is a common management practice in Swiss rabbit breeding which may, however, induce agonistic interactions resulting in social stress and severe lesions. On farms using artificial insemination, does are usually kept singly for 12 days after parturition to avoid pseudopregnancy and fighting for nests. The integration of new group members usually occurs after this isolation phase.

This study was conducted with 128 gravid does of the Hycole hybrid, housed in pens covering a floor area of 5.7 m<sup>2</sup> that was bedded with straw and furnished with elevated areas, hiding places and eight compartments with nest boxes. In the experiment, the fur of 16 groups of 8 does each was sprayed with either alcohol or vinegar to mask the pre-existing group odours, or with water (control groups) shortly before regrouping. Lesion scores, stress parameters (body temperature and blood glucose level) and behaviour were assessed before and after the isolation phase. Effects of treatment and time on all collected parameters were analysed using mixed models. On the second day after regrouping 43% of the does showed new lesions. In the first five days after regrouping, new lesions occurred in 60% of the does; 32% had severe lesions. After regrouping, more agonistic interactions were observed and body temperature and blood glucose levels were higher than before regrouping ( $P < 0.001$  each). Body temperature increased less in groups treated with vinegar compared to the other two treatments on the first day after regrouping ( $P = 0.017$ ). In all other parameters no influence of the treatment with alcohol or vinegar was found. These findings suggest that masking the group odours with alcohol or vinegar had little effect on lesions, stress and agonistic interactions. Therefore, alternative management procedures need to be developed to reduce lesions and stress caused by aggressive behaviour.

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## 1. Introduction

In Switzerland (Andrist et al., 2013) and in the Netherlands (Rommers et al., 2006), group housing of breeding does is a

promising housing form as an alternative to single housing, which is still common in most places. In some other countries, e.g. in Hungary (Szendrő et al., 2013), France (Mirabito, 2003) and Spain (Olivas and Villagra, 2012) studies on group housing have been conducted, indicating that it is also considered elsewhere. In their review Szendrő and McNitt (2012) concluded that group housing of does often results in stress, aggressiveness, lesions, a higher risk of disease and mortality,

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lower reproductive performance, and higher costs of production. Some of these problems are caused by the fact that on most farms where breeding does are housed in groups, they are frequently regrouped (Andrist et al., 2012). In Switzerland, does that are not pregnant are put into smaller pens without nests, whereas pregnant does are kept in pens with nests. These pens are bigger, making it less economic to keep non-pregnant does in them.

Nowadays, rabbit breeders employing group housing increasingly apply artificial insemination (AI) with either a 33- or 42-day reproduction cycle. In the AI management with a 42-day reproduction cycle, the does are kept singly from the 30th day of pregnancy, just before the expected parturition date, until 12 days after birth. During isolation does are kept in a separate compartment with a nest, within their group pen. Olfactory, acoustic and visual contact with pen mates and new group members are still possible, but physical interactions are prevented during this phase. New group members (pregnant does from another pen) are usually put in the new pen at the beginning of this isolation phase without them having the possibility to interact with the other group members. Isolation prevents fights for the nests and double litters. Isolating the does also inhibits mounting by other does after parturition, at a time when they are sexually receptive (Schlolaut et al., 2003), which may lead to pseudo-pregnancy and thus reduce the kindling rate. Double litters occur when two does kindle in the same nest, sometimes resulting in crushing of kits. Furthermore, routine control of the animals can be conducted more easily and accurately when the does are isolated. However, when the does are regrouped after this isolation phase, rabbit breeders often observe agonistic interactions (Andrist et al., 2013).

Several studies on rodents, primates and pigs revealed that changing group composition provokes stress reactions, often accompanied by increased aggression (Olsson and Westlund, 2007; Krauss and Hoy, 2011; Stukenborg et al., 2011) due to the establishment of a new social hierarchy in the dynamic group. Until some years ago, when pigs from different herds were put together for management purposes, an alcoholic spray was applied to the group to mask pre-existing odours and reduce fighting (Myktyowycz and Goodrich, 1974). Similarly, some rabbit farmers apply alcohol to reduce aggression when regrouping does (personal communication).

Regrouping pigs and rabbits causes problems because they recognise group membership (Myktyowycz and Goodrich, 1974). Rabbits have three externally secreting skin glands (Myktyowycz and Goodrich, 1974). Whereas the secretions from chin and anal glands are used for marking purposes and territorial activities (Myktyowycz and Dudzinski, 1966), inguinal glands seem to be important for individual identification (Goodrich and Myktyowycz, 1972) and the acceptance of individuals by their companions in organised groups (Hesterman et al., 1984). All the scents of these glands may contribute towards a “group odour” cocktail (Bell, 1980).

In this study we tested whether the use of alcohol or vinegar would mask the “group odour” and help to reduce lesions, stress and agonistic interactions when unfamiliar does are introduced to a breeding group after isolation. We

anticipated that stress levels and agonistic interactions would be back to basal levels within five days after regrouping (Graf et al., 2011).

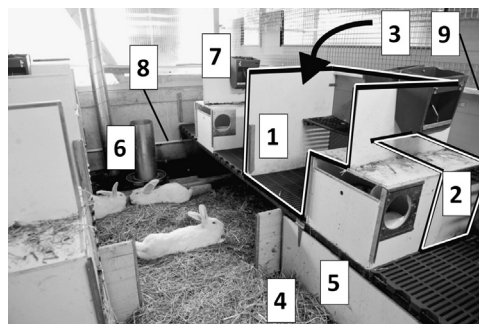
## 2. Materials and methods

### 2.1. Animals and housing

The experiment was conducted on a conventional rabbit breeding farm with 192 doe breeding units in Müswangen, Switzerland, using 128 pregnant does of the Hycole hybrid. All does were in their second parity and were eight months old. The experiment was performed in two consecutive trials with two sets of does kindled 21 days apart. There was a time lag of 21 days between the beginning dates of the trials. In both trials the 64 does each were housed in eight groups of eight does per pen. They were kept according to a Swiss label programme involving animal-friendly housing, which requires group housing and a separate nest for each pregnant doe. Each pen covered a floor area of 5.7 m<sup>2</sup> and was bedded with straw and furnished with elevated areas, hiding places, eight compartments with nest boxes, nipple drinkers and automatic feeders (Fig. 1). The pens were open at the top and the floor was divided into a central area for the adults and a smaller area for the kits. Stable temperatures varied between 11.9 and 13.8 °C. The artificial light was on during feeding and other work of the farmer, besides that, there was natural daylight in the stable (sunrise at about 7:30 am, sunset at around 5 pm). The does had ad libitum access to commercial rabbit pellets (UFA 857, UFA AG, Herzogenbuchsee Switzerland) and hay.

### 2.2. Data collection and treatments

In both trials the experiment started on the 30th day of pregnancy and lasted until the fifth day after regrouping (Fig. 2), resulting in a time span of 18 days. The second trial started three days after finishing the first trial. Data collection in both trials started at one day before isolation (1–2 days before expected parturition). On this day, data were also collected from does that were not in experimental pens but might be added later to replace non-pregnant does. Data were also collected two days before regrouping and one, two



**Fig. 1.** Pen Design. Separate compartment (1) with nest (2) and grid to isolate (3). Kit area (4) with hiding places (5). Feeder and drinker for the group (6+8) and for the isolation phase (7+9).

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