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Influence of raw material on the occurrence of tail-biting in undocked pigs

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ABSTRACT

The aim of this study was to reveal the effects of raw material provision on tail-biting outbreaks in long-tailed pigs. Two different substrates, dried corn silage (SG, n=245) and alfalfa hay (AG, n=245) were provided for the pigs twice per day from the second week of life until the end of rearing. The control of long-tailed pigs (CG, n=231) were kept without the provision of additional raw material. Each tail was scored regarding tail lesions/tail losses once per week with a four-point score (0=no damage/original length, 3=severe damage/total loss). Weight was collected at the beginning and at the end of rearing. The effect of week after weaning, the batch and the interaction between treatment group and batch had highly significant influences on tail lesions ($p < 0.001$). The main concentration of behavioural disorder took place in the rearing phase. Tail-biting started on average two to three weeks after weaning, followed by tail losses one to two weeks later. The effect of batch had a highly significant influence on tail losses at the end of rearing ($p < 0.001$). The number of tail losses decreased with the number of batches and ranged from 98.6% in batch one to 8.5% in batch ten. This can be explained by enhanced and more precise animal observation by stable staff and points out the learning process in the course of the study. At the end of rearing, piglets of all batches had lost their tails to the greatest extent in CGs (48.7%), followed by AGs (45.2%) and SGs (41.3%). There was no clear trend in total weight gain regarding the level of tail lesions and tail losses. Corn silage stayed attractive for the piglets during the whole observation period, whereas the acceptance of the alfalfa hay decreased towards the end of rearing. The daytime, the batch and the day after weaning, as well as the interaction between treatment group and day after weaning had highly significant influences on the overall activity behaviour during rearing ($p < 0.001$). To summarise, the rearing of long-tailed pigs requires intensive animal observation and direct intervention in case of tail-biting outbreaks. A provision of raw material on the floor of the piglet nest (suckling period) and in a piglet bowl (rearing period) from the second week of life until the end of rearing cannot prevent tail-biting during rearing, but reduces the occurrence of the behavioural disorder in long-tailed pigs.

1. Introduction

Tail-biting in pigs is a welfare concern in intensive pig husbandry and leads to economic losses (EFSA, 2007). The multifactorial background makes it difficult to deal with the problem. Higher stocking densities and deficiencies in feed quality or accessibility (Moinard et al., 2003), poor ventilation (Hunter et al., 2001) as well as a lack of rooting substrate (Zonderland et al., 2008) have been identified as environmental risk factors. On the biological side, poor health (Day et al., 2002), breed (Breuer et al., 2003) and gender (Zonderland et al., 2010a) could also play a role. The pigs' need to perform exploration and foraging behaviour is considered to be a major underlying motivation for tail-biting (EFSA, 2007). It should be considered that pigs in the wild spend more than 70% of their daily activity with these behavioural patterns, which can be expressed only to a minor extent in the barren conditions of intensive housing systems. When suitable material is unavailable, pigs may redirect their search behaviour towards other pigs and the pen's surroundings (EFSA, 2007). In accordance with the EU Directive (2008/120/EG), pigs must have permanent

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access to a sufficient quantity of material such as straw, hay, wood, sawdust, mushroom compost or peat to enable proper investigation and manipulation activities. However, under practical conditions in Germany, environmental enrichment is mainly limited to plastic toys or metal chains; even though the absence of particulate, rootable substrate has already been identified as a significant hazard leading to tail-biting (EFSA, 2007).

Tail-biting as a form of cannibalism is not a new phenomenon. Since the intensification of pig production in the 1950s, it has turned out to be a problem and until now tail-docking has been the most efficient way to avoid it. Under common intensive farming conditions, tail-docking reduces the frequency of tail-biting, but does not completely eliminate the problem when unfavourable conditions persist (EFSA, 2007). However, European law (2001/93/EG) prohibits the routine docking of pig tails and it is realised under practical conditions using veterinary case permissions. In order to turn away from this procedure towards the integrity of the animals' body and improvements in animal welfare, there is a need for intensive research into docking alternatives. An important approach to minimise the risk for tail-biting is the offer of manipulable material (Zonderland et al., 2008). It has been proved that environmental enrichment reduces time spent involved in harmful social and aggressive behaviour (Beattie et al., 2000). Several studies have shown a reduction in tail-biting behaviour through environmental enrichment with straw (Van de Weerd et al., 2006; Day et al., 2008) or other material which can to be rooted by the animals (Sneddon et al., 2001). These studies focused on the observation of pigs in fattening units, whereas recent studies have shown that behavioural disorder among long-tailed pigs occurs in rearing units (Abriel and Jais, 2013). Furthermore, it has been pointed out recently that pre-weaning enrichment could have effects on tail-biting behaviour in later life (Oostindjer et al., 2010; Telkänranta et al., 2014). The aim of this study was to reveal the effects of raw material provision from the second week of life until the end of rearing on the occurrence of tail-biting in undocked pigs. Thus, the substrates dried corn silage and alfalfa hay were used to enable the piglets to perform their natural exploration and foraging behaviour. Furthermore, the intensity and duration of occupation with the material provided and the different behavioural patterns of the piglets were analysed by video observation.

2. Materials and methods

2.1. General aspects

The pigs in the present study were kept on the research farm of the Chamber of Agriculture of Schleswig-Holstein (Futterkamp), Germany, in accordance with EU Directive (2008/120/EG) and EU Directive (2010/63/EG) and in accordance with the Tierschutz-Nutztierhaltungsverordnung (TierSchNutztV, 2006). In case of tail-biting outbreaks, manipulable material was provided in control pens as well to avoid the endangerment of animal welfare. Identified biters were removed from the pen and injured piglets were medically treated. If tail-biting did not abate, a separation of piglets was carried out.

2.2. Animals and housing

Data collection was carried out between September 2013 and April 2014. Farrowing and rearing followed conventional farming practices; the farm size was 400 sows and 2500 rearing places. In the present study, 721 crossbreed piglets (Pietrain × (Large White × Landrace)) from 60 litters were housed in ten batches. Each batch corresponded to a farrowing week. The piglets had an average birth weight of 1.4 ± 0.3 kg. The suckling period took place in conventional farrowing systems (5.2 m^2 per pen), tails were not docked and males were not castrated. From the second week of life until weaning, the piglets received a pre-starter diet (14.6 MJ ME, 17.5% protein, 1.45% lysine, 0.25% sodium). The piglets were weaned after on average 28 days with an average weaning weight of 8.0 ± 1.7 kg.

Rearing lasted for 40 days until an average weight of 25.4 ± 2.3 kg. The piglets were housed in mixed gender groups consisting of one or two litters (12 or 24 piglets per pen) with an average space allowance of 0.38–0.42 m^2 per animal. According to the units, the feeding system was either mash or dry feed ad libitum with an animal to feeding place ratio of 2:1. For the first two weeks of rearing the piglets received a starter diet (14.4 MJ ME, 18.0% protein, 1.40% lysine, 0.20% sodium), thereafter the diet was gradually changed over the next four days and fed until day 40 of rearing (13.4 MJ ME, 17.0% protein, 1.30% lysine, 0.25% sodium). The drinking system consisted of nipples and bowls, the floor was fully slatted and no bedding material was offered. Plastic sticks, plastic balls and hard wooden sticks were provided as enrichment material. The environmental temperature during rearing was automatically regulated by forced ventilation. It was set at 29.5 °C on day one of rearing and decreased stepwise until 22.0 °C on day 40. The animals had full artificial lighting between 06:00 h and 18:00 h.

2.3. Experimental design

In total, 721 piglets were divided randomly into three treatment groups litter-wise: a control group (CG) with 231 long-tailed piglets housed without raw material, a dried corn silage group (SG) and an alfalfa hay group (AG) with 245 long-tailed piglets each. In the farrowing units, 20 litters were used for each treatment, two litters of each treatment group (n = 3) per batch (n = 10) respectively. After weaning, the piglets were housed either litter-wise or two litters were mixed, resulting in 14 pens for each

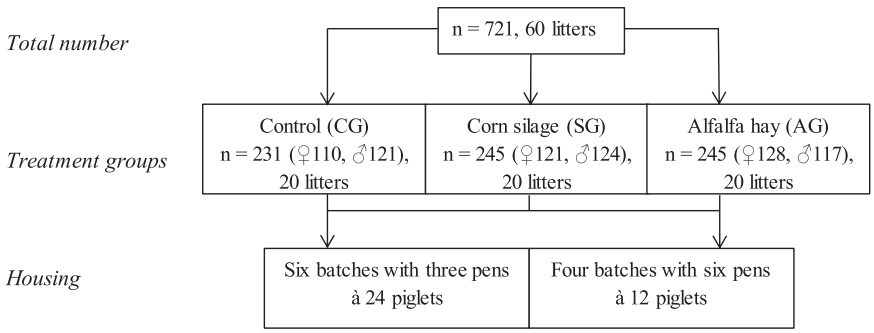

Fig. 1. Schematic view of the experimental set-up regarding rearing.

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