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Mounting behaviour in finishing pigs: Stable individual differences are not due to dominance or stage of sexual development

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ABSTRACT

Every year around 100 million male piglets are castrated in the EU, usually without anaesthesia or post-operative analgesia. This surgical intervention is painful and stressful. Several main players within the pig industry have voluntarily agreed to end the practice of surgical pig castration in the EU by 2018. One alternative to castration is entire male pig production. However, entire males behave differently than castrates, for example, by performing more mounting behaviour, which is suggested to be a welfare problem.

The aim of our study was to develop a comprehensive ethogram of different types of mounting and to investigate properties, causes and consequences of mounting behaviour in finishing pigs.

The study included 80 entire male and 80 female pigs from two farrowing batches born six weeks apart. Mixed sex and single-sex housing of pigs are both common in pig farming, so to ensure our study was representative, the 160 pigs were assigned to social groups of 20 in three treatments: entire male pigs only (MM, 2 groups, $n = 40$), entire females only (FF, 2 groups, $n = 40$) and entire males and females mixed together (MF, 4 groups, $n = 80$). Measurements took place during the final six weeks before slaughter (between 63.5 and 105.5 kg). Observations of mounting behaviour on 12 days per batch suggested that: (i) males mounted more than females, (ii) within sex, there was no effect of treatment on the amount of mounting (although the statistical power of the study to detect these effects was low), and (iii) there were individual differences in mounting that were stable over time (within sex).

Classification of mounting into different categories revealed that sexual mounting was most common overall and in males but only rare in females. Compared to other types of mounting (e.g. caused by crowding or during a fight), sexual mounts lasted longer and provoked more screaming by the recipient. There were no relationships between mounting behaviour on the one hand and dominance rank in food competition tests, the circulating levels of sex hormones (oestradiol, testosterone and progesterone) at the end of the study, the health scores (lameness and scratches) or weight gain on the other hand.

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The stable individual differences of mounting over time suggest that mounting behaviour is a trait of the individual rather than the appearance of random outbreaks. However, these differences in mounting cannot be explained by dominance behaviour or by differences in sex hormone concentrations that could indicate the onset of puberty.
Mounting behaviour and in particular sexual mounting provoked high pitched screaming of the recipients indicating that mounting is a welfare problem. For the welfare assessment of entire male pig production the performance of mounting behaviour should be considered.

1. Introduction

Every year approximately 100 million male piglets are castrated in the EU (EFSA, 2004), usually without anaesthesia or post-operative analgesia (Prunier et al., 2006). This surgical intervention itself is stressful and painful (Marx et al., 2003; Prunier et al., 2005), and differences in behaviour indicate that pain can persist for up to five days after castration (Hay et al., 2003). Norway banned the castration of male piglets entirely in 2009 and Switzerland only permits this intervention under anaesthesia. Several of the main industrial pig producers voluntarily agreed in 2010 to end the practice of surgical pig castration in the EU by 2018 (European Commission, 2010).

One alternative to surgical castration is the rearing of entire males as it is common in the UK and for the majority of producers across Spain and Portugal. However, entire male pigs show more aggressive and mounting behaviour compared to castrates (Fredriksen et al., 2008; Rydhmer et al., 2010). Consequently, the consequences of rearing entire males should to be assessed so that adapted management and husbandry strategies can be adopted to improve welfare.

The objectives of this experiment were to develop and apply a comprehensive ethogram describing the variety of types of mounting behaviour and to investigate properties, causes and consequences of this behaviour in entire male and female finishing pigs kept in single and mixed-sex groups.

It was hypothesised that most mounting would occur in single-sex groups with males, followed by mixed-sex groups and that least mounting is seen in single-sex groups with females (H1). Clark reported that the amount of individual mounting behaviour observed in a behavioural test of pig aggression (resident-intruder test) was consistent between test sessions (Clark, 2007). Our previous pilot data (Scott et al., 2013) suggest that the level of mounting shows considerable variability within a population. The hypothesis was that mounting in the home pen shows stable individual differences over time (H2).

Two main causes underlying mounting behaviour have been discussed in the literature. Firstly, mounting has been described as sexual behaviour (Rydhmer et al., 2006; Fredriksen et al., 2008). As the number of pigs reaching puberty should increase with the age of the pigs, it was hypothesised that the amount of mounting would also increase over time (H3). Moreover, individual differences in mounting behaviour should be related to the rise in circulating sex steroids as a marker for the puberty onset (H4). A second explanation for the performance of mounting is that it might be a form of dominance behaviour (Fredriksen et al., 2008). We hypothesised that mounting behaviour is positively correlated with dominance (H5). Finally, as mounting has been reported to have negative economic and welfare consequences (Rydhmer et al., 2006), we quantified the effects of mounting on weight gain, lameness and scratches.

The experiment included two batches of 80 finishing pigs each allocated to three treatment groups (single males, single females, and mixed-sex), in order to represent the typical diversity of finisher housing in the pig industry, where mixed sex or single-sex housing from weaning are both commonly used by different pig producers. Measurements comprised observations of mounting behaviour over six weeks per batch, quantification of sex steroids, dominance tests, pig weight and scoring of lameness and scratches.

2. Materials and methods

2.1. Animals and housing

The study included 80 entire male and 80 female crossbred pigs (Synthetic white × (Large white × Landrace)) from two farrowing batches born six weeks apart. The 80 pigs of each batch were kept in four pens of 20 pigs each. In each batch one pen only contained males (MM), one only females (FF) and two of the pens comprised 10 males and 10 females each (FM1 and FM2). This low level of replication at the group level meant that the power of the study to detect treatment differences was low, so non-significant results for treatment differences should be treated with caution.

Allocation to the four groups was balanced by weight (Table 1). When weaned and weighed at the age of four weeks the 40 heaviest males and the 40 heaviest females out of 105 piglets in batch 1 and 91 piglets in batch 2 were selected for the study. All pigs were given individual coloured ear tag combinations to make them easily identifiable. Five pigs of batch 1 and eight pigs of batch 2 died before the start of the experiment, had to be euthanised, or were separated from their groups due to bitten tails during the course of the study.

The study took place from day 74 until day 111 after weaning, covering the last six weeks before pigs were slaughtered at an average weight of 105.5 ± 9.8 kg. This period was chosen as most mounting is seen in finishing pigs (Scott et al., 2013). Pigs were moved from the grower to the finisher accommodation at least six days prior to the beginning of the study. Experimental animals were kept in a block of four adjacent pens with pairs opposite on either side of the central passage. The arrangement of