



# A comparison of the impact of behaviours performed by entire male and female pigs prior to slaughter on skin lesion scores of the carcass



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## ABSTRACT

The production of entire males is likely to increase with the introduction of a voluntary EU level ban on castration coming into effect in 2018. However the rearing of these animals may pose other challenges regarding welfare and production problems relating particularly to carcass quality. The aim of this study was to investigate whether there is a relationship between the aggressive and mounting behaviours performed by pigs in the final weeks prior to slaughter and skin lesion scores recorded on farm and on the carcass. A total of 70 entire male and 71 female pigs (Large White × Landrace) were housed in five pens of each sex (mean of  $14.1 \pm 0.74$  pigs/pen) in the finisher house. On days –14 and –1 relative to slaughter (Day 0) pigs were individually weighed and skin lesions were scored according to severity. Posture and all incidences of harmful, aggressive and mounting behaviours were directly recorded in  $3 \times 2$  h periods (8–10 h, 11–13 h, 14–16 h) on days –13, –9, –7 and –2. At the slaughterhouse, tail lesions, skin lesions and bruises were scored on all carcasses. Boars performed more aggressive (1.8 vs. 1.0 aggression/pig/period; s.e.m. 0.22) and mounting behaviours (0.4 vs. 0.005 mounts/pig/day; s.e.m. 0.02) than gilts ( $P \leq 0.05$ ). In general, postures were similar in both sexes ( $P > 0.05$ ). On Day –1, boars had higher skin lesion scores than gilts (11.2 vs. 8.2; s.e.m. 0.95;  $P \leq 0.05$ ). Boars had higher skin lesion scores on the carcasses (1.9 vs. 1.3; s.e.m. 0.10;  $P \leq 0.05$ ) and more fighting-type bruises (4.5 vs. 2.3; s.e.m. 0.35;  $P \leq 0.05$ ) than gilts. There was no association between aggressive behaviour and skin lesions scored on farm on Day –1 ( $P > 0.05$ ) but there were positive correlations between aggressive behaviour and skin lesions scored on the carcass (actor:  $r = 0.383$ ,  $P \leq 0.001$ ; recipient:  $r = 0.294$ ,  $P \leq 0.001$ , respectively) and fighting-type bruises (actor:  $r = 0.442$ ,  $P \leq 0.001$ ; recipient:  $r = 0.297$ ,  $P \leq 0.001$ , respectively). Skin lesions scored on the carcass were a more sensitive indicator of aggressiveness and welfare of pigs than those recorded on the live animal. The results from this study reinforce the importance of on-line monitoring of carcass skin lesion in the routine inspection procedures as a complementary tool to identify critical points along the slaughter chain and as an indicator of animal welfare on farm.

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## 1. Introduction

The main reason why male pigs are castrated is the possible presence of boar taint in pork, but the removal of testicular hormones also reduces aggression and sexual

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behaviour (Fredriksen et al., 2008). However, castration causes pain and discomfort (Llamas Moya et al., 2008) and therefore raises ethical and welfare concerns. The production of entire males is likely to increase with the introduction of a voluntary EU level ban on castration coming into effect in 2018 (Fredriksen et al., 2008; Fàbrega et al., 2013). The rearing of entire males may pose other challenges regarding welfare and production problems relating particularly to carcass quality.

Growing pigs in commercial production systems perform a variety of undesirable behaviours such as belly-nosing, tail- and ear-biting (Blackshaw, 1981; Breuer et al., 2005) and aggression (Andersen et al., 2000) which pose risks to pig welfare. In systems where entire males (i.e. boars) instead of castrates are produced the performance of high levels of aggressive and mounting behaviour further aggravates the risk to welfare (Rydhmer et al., 2006; Boyle and Bjorklund, 2007; Hintze et al., 2013). Lameness is a risk when these behaviours are performed on fully slatted floors (Scott et al., 2006) and injuries such as lesions to the skin caused by the teeth during aggression (Turner et al., 2006) and the front legs during mounting also occur (Faucitano, 2001). Bruises to the loin area are also seen in pigs coming from entire male production systems (Harley et al., 2014). Although the precise aetiology of loin bruising is unclear, it would appear that pressure applied by the sternum of the mounting pig to the loin area of the pig being mounted could be involved, particularly when the behaviour is performed by heavy pigs close to slaughter (L Boyle, personal communication). The ability to measure lesions arising from these undesirable behaviours performed on farm on the carcass would yield a valuable welfare diagnostic tool (Harley et al., 2012a, 2012b, 2014). Therefore, the aim of this study was to investigate whether there is a relationship between the aggressive and mounting behaviours performed by pigs in the final weeks prior to slaughter and skin lesion scores recorded on farm and on the carcass.

## 2. Materials and methods

The study was carried out during summer 2013 at the Teagasc integrated 250 sow research herd based at Moorpark, Fermoy, Co. Cork, Ireland. Pigs were assembled into groups at weaning (28 days of age) based on sex and size and the group composition was unaltered through to slaughter. In the pre-transport pens, trial animals were randomly mixed with 36 female and male non-trial pigs from the same farm, and were transported to an abattoir 100 km away, in a conventional two tier lorry (stocking density was within the legislative requirement of 0.42 m<sup>2</sup>/pig (Council Regulation, 2005). Pigs were CO<sub>2</sub> gas stunned after c. 1 h in lairage with solid concrete walls and floors (water was available but no food). The work was approved by the Teagasc Animal Ethics Committee (TAEC 24/2013).

### 2.1. Animals and housing

A total of 70 entire male and 71 female pigs, born from Large White × Landrace sows, were housed in five pens of each sex ( $n=5$  female pen,  $n=5$  male pen; mean of

$14.1 \pm 0.74$  pigs/pen) in the finisher house. Pens (2.32 m × 4.73 m) had fully slatted, concrete floors and were furnished with chains hanging from the pen walls and a single rubber enrichment device (EasyFix™ Rubber Products, Ballinasloe, Co. Galway, Ireland) suspended at pig height in the middle of the pen. All animals were ear-tagged with a unique number and marked on the lumbar area using animal marking spray. In addition to the herd identification tattoo (i.e. 'slap number'), all pigs also received an individual tattoo on the shoulder for identification of the carcasses.

Pigs had ad libitum access to a standard, commercial, pelleted finisher diet (Vigour, Nutec, Naas, Co. Kildare, Ireland) in a multi-space feeder (75 cm length × 60 cm high × 30 cm deep) without divisions which was replenished twice a day (10:00 h and 16:00 h). Water was available ad libitum from a single bite-drinker in each pen. Data collection took place on farm for two weeks prior to slaughter.

### 2.2. Measurements on farm

#### 2.2.1. Performance

On days –14 and –1 relative to slaughter (Day 0) pigs were individually weighed and average daily gain was determined by the difference between weight on Day –1 and Day –14 divided by 14 (i.e. the number of days).

#### 2.2.2. Behaviour

Behaviour was directly recorded in 3 × 2 h periods (8:00–10:00 h, 11:00–13:00 h, 14:00–16:00 h) on days –13, –9, –7 and –2. Two trained observers watched different pens simultaneously and they were balanced across sex and pens. Observation times were also balanced across sex and pens thus the observations for each pen were distributed equally across the recording periods.

*Scan sampling:* every 3 min, the posture (Table 1) of each pig in the pen was recorded and then the observer moved on to the next pen according to the schedule, until the two hour observation schedule was completed, this yielded 192 scan samples per pen.

*All-occurrence sampling:* after the postural behaviour of the pigs in each pen was recorded by scan sampling, the pigs were observed continuously until 3 min had elapsed with all incidences of harmful, aggressive and mounting behaviours (Table 1) being recorded during this time. In total, each pen was observed for 576 min. The identity of the pigs involved in these interactions was also recorded.

#### 2.2.3. Skin lesion scores

On Days –14 and –1, after the pigs were weighed, skin lesions were scored according to severity on the back, left and right hind quarters, side, belly, shoulders, neck and ears. Scores were summed to yield a total lesion score for each pig. Lesions were scored as follows: (1) superficial or pale red lesion; (2) red lesion; (3) deep red or extensive lesion. Additionally, scores from the ears, neck and shoulders (front of body), and back and hindquarters (rear of body) were summed separately as lesions to these areas

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