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Nest building and posture changes and activity budget of gilts housed in pens and crates

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ABSTRACT

The aim of the present work was to study nest building, posture changes and the overall activity budget of gilts in pens vs. crates. Twenty-three HB gilts (high piglet survival day 5) and 21 LB gilts (low piglet survival day 5) were video recorded from day 110 in pregnancy to four days after farrowing in either a farrowing pen or farrowing crate. The gilts were provided with 2 kg of chopped straw daily from day 113 of pregnancy until farrowing in both environments. Nest building and other activity measures of the sows were analysed using continuous sampling the last 12 h before the first piglet was born until 8 h after the birth of the first piglet. There was no significant effect of the sows breeding value on any of the sow behaviours. Sows housed in pens spent significantly more time nest building than crated sows from 4 to 12 h prepartum ($P < 0.05$). Crated sows spent more time sitting ($P < 0.01$), chewed more frequently on pen fittings ($P < 0.001$) and showed a higher frequency of quick flops when entering a resting position after farrowing ($P < 0.05$), but had a lower number of posture changes ($P < 0.05$) after farrowing.

In conclusion, provision of a similar amount of straw does not compensate for the lack of space in the crate compared to the pens. Sows in pens spent more time nest building from 4 to 12 h post partum compared to crated sows, and crated sows showed more behaviours related to frustration and restlessness.

1. Introduction

Piglet mortality varies greatly between sows within the same herd, and this variation can partly be explained by the maternal behaviour of the sow (e.g. Wechsler and Hegglin, 1997; Ahlstrøm et al., 2002; Andersen et al., 2005). For example, sows with few crushed piglets have longer duration of lying down movements (e.g. Burri et al., 2009), and have more nose contact with the piglets around posture changes (e.g. Andersen et al., 2005). These sows are less active during the last hours before farrowing and the early stages of lactation (e.g. Jarvis et al., 1999; Andersen et al., 2005). There are also differences in their nest building behaviour; sows with few crushed piglets display a higher nest building activity (Wischner et al., 2009), longer bouts of nest building and more elaborate nest building behaviour during the last 12 h before farrowing compared to sows with a higher number of crushed piglets (e.g. Cronin and van Amerongen, 1991; Andersen et al., 2005; Pedersen et al. (2008))

The farrowing crate was introduced to reduce piglet mortality, but is criticised for severely reducing the welfare of the sow. According to the Norwegian Regulation for Animal Welfare, all lactating sows must be kept in a loose house farrowing pen, but in most other European countries, the use of farrowing crates is still accepted. Some

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studies report higher piglet mortality due to crushing in pens than in crates (Cronin and Smith, 1992; Cronin et al., 1996), while others report similar mortality in both types of housing (e.g. Weber et al., 2007; Pedersen et al., 2011). A recent study in 112 breeding English pig farms also reviled that there was no significant difference in mortality of live born piglets between crates, indoor pens with confinement only at the time of birth and outdoor arcs (Kilbride et al., 2012). Nest building activity typically starts earlier in the pens, is more elaborate and has a longer duration than in the crate (e.g. Damm et al., 2003; Thodberg et al., 2002), and there is less activity in the last period prior to farrowing in the pen compared to in the crate (e.g. Damm et al., 2003). The farrowing crate has several negative effects on maternal behaviours (e.g. Arey and Sancha, 1996; Jarvis et al., 2001), including restricting the nest building activity (e.g. Hansen and Vestergaard, 1984; Blackshaw et al., 1994; Jarvis et al., 1997; Damm et al., 2003), more stereotypies and a higher heart rate prior to farrowing (e.g. Damm et al., 2003). According to Jarvis et al. (2001), penned gilts were standing and walking more, performed more substrate-directed behaviours and had lower pre-parturient levels of ACTH and cortisol than crated gilts, irrespective of whether straw was available or not. In fact, straw did not have any stress physiological effect in their study. This underlines that sufficient space is crucial in the nest building phase when the sow becomes more restless. The gilts in the present study were selected for either high or low piglet survival at day 5 (Su et al., 2007), but no differences were found between these two breeding lines with respect to piglet mortality or most causes of mortality (Pedersen et al., 2011), which could be due to low heritability of piglet survival. Thus we did not expect to find any major differences between these genetic lines regarding nest building activity or activity budget in the present study either, but breeding line still had to be kept as a treatment group because this was a part of the original experimental set-up (Pedersen et al., 2011).

The aim of the present work was to study nest building, posture changes and the overall activity budget of gilts in pens vs. crates.

2. Materials and methods

2.1. Experimental design

This experiment took place at the Research Centre Foulum in Denmark. During four farrowing batches, a total of 44 gilts were video recorded from day 110 in the pregnancy to four days after farrowing in either a farrowing pen or farrowing crate to document nest building behaviour and other sow behaviours. The data in this study is based on a larger study where farrowings were attended and blood samples and other measures were collected from the newborn piglets.

2.2. Animals and housing

The animals were Yorkshire × Danish Landrace gilts, which were inseminated in their second oestrus with semen from Duroc × Hampshire boars. The gilts were selected from a breeding herd with ongoing selection for number of live piglets until day 5. The breeding value for all gilts in the herd was known for several traits, amongst other piglet survival rate until day 5 (Su et al., 2007). For the present experiment, gilts were selected based on piglet survival rate to day 5 to represent two different breeding classes: high piglet survival until day 5 (HB) and low piglet survival until day 5 (LB). In this study a total of 23 HB and 21 LB gilts were used. Of the HB gilts, 12 were crated and 11 were kept in pens. Of the LB gilts, 11 were crated and 10 were kept in pens.

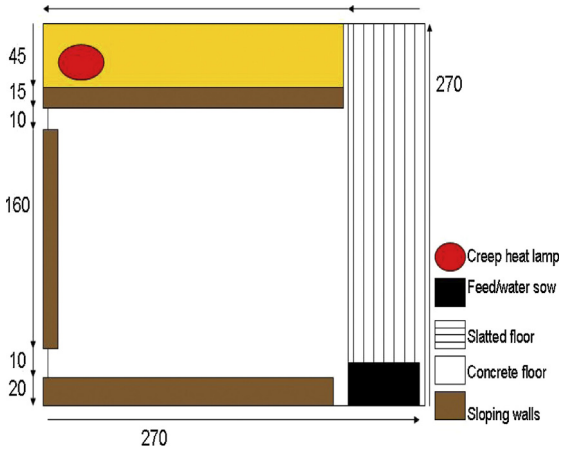

Fig. 1. The farrowing pen (all measures in cm).

The gilts were brought from the group housing gestation unit to their farrowing environment at day 110 in the pregnancy, 6 days before expected farrowing. The farrowing crate measured 4.7 m^2 in total of which the sow area was 1.5 m^2 and the creep area measured 0.8 m^2 (Fig. 1). The farrowing pen measured 7.3 m^2 in total, of which the sow area was 6.2 m^2 and the creep area measured 1.2 m^2 (Fig. 2). Temperatures in both environments were kept at 18–20 °C, and the surface temperature of the floor in the

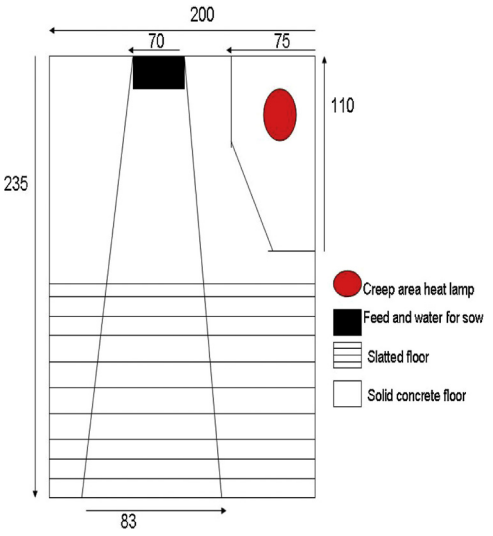

Fig. 2. The farrowing crate (all measures in cm).