Applied Animal Behaviour Science 120 (2009) 62–67

Contents lists available at ScienceDirect

Applied Animal Behaviour Science

journal homepage: www.elsevier.com/locate/applanim

Piglet use of the creep area—Effects of breeding value and farrowing environment

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ARTICLE INFO

Article history:
Accepted 29 May 2009
Available online 28 June 2009

Keywords:
Breeding value
Creep area
Farrowing environment
Piglet mortality

ABSTRACT

The objective of this study was to investigate piglet use of the creep area, comparing litters of sows with a high vs. low breeding value for piglet survival in the first 5 days postpartum, that were either housed in crates or individual pens during farrowing and lactation. Seventy-five Yorkshire × Danish Landrace sows were video recorded for 4 days after farrowing, and the analysis was conducted using instantaneous sampling every 10 min commencing 24 h after the birth of the first piglet for a period of 72 h. Breeding value for piglet survival had no effect on piglet use of the creep area or time spent in any location of the farrowing environment. Farrowing environment had significant effects on piglet location; during all days there were significantly more piglets in the creep area in the crates compared to the pens ($P < 0.01$), and this difference was larger at 24–48 h than at 49–72 h and at 73–96 h after birth ($P < 0.05$). Piglets in pens spent significantly more time resting near the sow, excluded nursing ($P < 0.001$), and this percentage decreased over time after farrowing ($P < 0.001$) in both the crates and the pens. In conclusion, piglet use of the creep area was higher in the crate compared to the pen particularly during the second day of life. This may partly be due to a much larger proportion of uncomfortable, slatted floor in the crates, and the shorter distance from the sow to the creep area in the crate.

1. Introduction

A significant proportion of the piglet mortality occurs within the first 2 days after farrowing (English and Morrison, 1984; Dyck and Swierstra, 1987; Andersen et al., 2005), and starvation and crushing by the sow may explain around 50–80% of these losses (e.g. Marchant et al., 2001). In addition to improving maternal abilities of the sows (e.g. Valros et al., 2003; Jarvis et al., 2005) and providing extended management around the time of farrowing (White et al., 1996; Andersen et al., 2007; Andersen et al., 2009), many farmers try to encourage the piglets to use the creep area when suckling is not in progress as soon as possible after farrowing. It is commonly assumed that minimizing the frequency and duration of piglets stay in the sow area reduces the risk of being crushed or trampled by the sow the first days after parturition, but at present this has not been documented.

There are many ways of making the creep area more attractive to the piglets (Morrison et al., 1983; Lay et al., 1999), but most importantly it should be a warm, dry and soft resting area (Ziron and Hoy, 2003) without draught, and that is easily accessible (Zhang and Xin, 2001). However, piglets prefer to lie next to an anaesthetized piglet in a cold area than alone in a warm area (Hrupka et al., 2000), which also illustrates a high motivation for piglets to lie close to other littermates regardless of temperature. Piglets prefer lying close to the sow for the first 2 days after farrowing despite unfavorable conditions in the sow area (Hrupka et al., 1998; Berg et al., 2006; Moutsen et al., 2007). At this age, piglets tend to use the creep area more in crates than pens (Blackshaw et al.,

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0168-1591/$ – see front matter © 2009 Elsevier B.V. All rights reserved.
doi:10.1016/j.applanim.2009.05.014

1994) and more in pens with slatted floor and no heat in the sow area than in pens with solid floor and heat in the sow area (Houbak et al., 2006; Moutsen et al., 2007). Piglets will increase their use of the creep area from day 3 (Hrupka et al., 1998; Berg et al., 2006) and there is a large variation in the use of the creep area between litters within the same herd (Andersen et al., 2007).

The large variation in the use of the creep area is interesting, and it has been suggested that the sow has an effect on piglet use of the creep area (Berg et al., 2006). For example mothers with good maternal skills may be more effective in gathering the piglets in a group when entering the nest and before she lies down. This may potentially reduce the risk of crushing. Individual differences in maternal behaviour may be more evident when the sow is able to move freely and interact with her piglets (e.g. Boe, 1993, 1994). Increased piglet survival may be achieved indirectly by selecting for optimal maternal behaviour (i.e. more attentive mothers) to prevent crushing or by selecting for piglet survival directly. However, when selecting sows based on their breeding value for piglet survival at day 5 such as in the present study, we do not know whether the improved survival is achieved through improved maternal skills, the prenatal environment, factors related to the birth process or a combination of many factors. If increased piglet survival is partly a result of improved maternal behaviour, we would expect to see some differences in sow and piglet behaviour between the two breeding lines.

The physical environment of the sow and litter has been given much research attention during the last 20 years and the debate concerning crates versus pens is still active, both with respect to the welfare of the sow (e.g. Blackshaw et al., 1994; Jarvis et al., 1997) and piglet mortality (e.g. Cronin and Smith, 1992; Weary et al., 1996b; Marchant et al., 2000; Weber et al., 2007). The restrictive farrowing crate has negative effects on sow health (Verhovsek et al., 2007), stress level during farrowing and lactation (Jarvis et al., 1997) and increases farrowing duration (Hansen and Vestergaard, 1984; Biensen et al., 1996). Some studies have reported higher piglet mortality due to crushing in pens than in crates (Cronin and Smith, 1992; Cronin et al., 1996), whereas others find similar results in both types of housing (e.g. Schmidt, 1992; Biensen et al., 1996; Cronin et al., 2000; Weber et al., 2007; Pedersen et al., 2008).

According to the Norwegian Regulation for Animal Welfare, all nursing sows must be kept in a loose house farrowing pen, but in Denmark and other countries, the use of farrowing crates is still accepted. Both in Norway and Denmark around 14–15% of all live born piglets die before weaning (Norsvins In-Gris Årsstatistikk, 2005; Sloth and Bertelsen, 2007) and breeding for increased litter size is one of the major factors that cause higher mortality irrespective of the farrowing environment (e.g. Pedersen et al., 2006; Weber et al., 2007).

The aim of the present study was to investigate piglet use of the creep area in litters of sows with a high versus low breeding value for piglet survival until day 5, which were either housed in crates or individual pens during farrowing and lactation. Based on earlier findings (e.g. Blackshaw et al., 1994), we predicted that piglets born in crates would spend more time in the creep area than piglets born in pens. We also predicted that piglets born in pens would spend more time resting in contact with the sow during the first 3 days after birth than piglets born in crates.

2. Materials and methods

2.1. Experimental design

This experiment took place at the Research Centre Foulum in Denmark. During four farrowing batches in 2007, 75 gilts were video recorded from farrowing to 4 days after farrowing (0–96 h) in either a farrowing pen or crate to document piglet use of the creep area.

2.2. Animals

The sows were Yorkshire × Danish Landrace gilts, and they were inseminated in their second oestrus at around 210 days of age with semen from Duroc × Hampshire boars. Two breeding lines of sows were used in the experiment (Su et al., 2007): 43 HB gilts (high piglet survival until day 5) and 32 LB gilts (low piglet survival until day 5). Of the HB gilts, 24 were crated and 19 were kept in pens. Of the LB gilts, 19 were crated and 13 were kept in pens.

All piglets were marked with numbers immediately after birth. Birth assistance during farrowing was only given if more than 3 h had passed since the last piglet was born. No other assistance during the lactation period was given, and a piglet without any possibility to live due to injuries, starvation or hypothermia was euthanized by the staff.

2.3. Housing

During the gestation period the gilts were housed together in groups of 30 with automatic feeders. The gilts were brought to their farrowing environment at day 110 post-insemination, 6 days before expected farrowing. The farrowing pens measured 7.3 m^2 in total with 1.9 m^2 slatted floor and had solid sloping walls on three sides. The sow area was 6.2 m^2 and the creep area was 1.2 m^2 (Fig. 1).

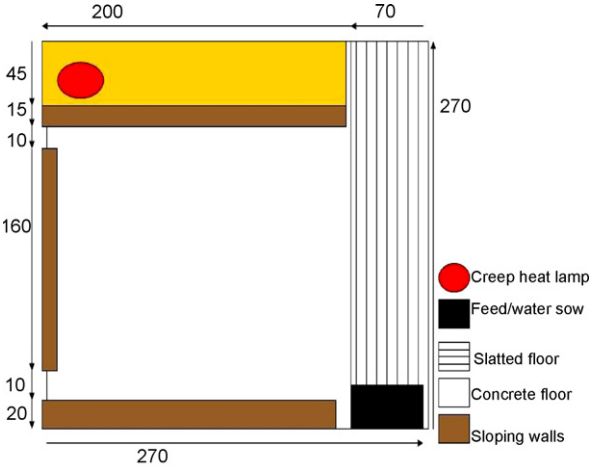

Fig. 1. The farrowing pen (all measures in cm).