Use of strategic sow confinement with farrowing induction can achieve similar stillborn mortality and reduce overlay caused piglet mortality compared to loose housed sows

P.C. Condous¹, K.J. Plush², A.J. Tilbrook² and W.H.E.J. van Wettere¹

¹School of Animal and Veterinary Sciences, University of Adelaide, Roseworthy SA 5371 Australia
²Livestock and Farming Systems, South Australian Research and Development Institute, Roseworthy SA 5371 Australia
Presenting author: Patricia Condous patricia.condous@adelaide.edu.au

Summary

Sow confinement around farrowing can negatively affect farrowing performance, alternatively reducing confinement can increase live born piglet mortality. This experiment investigated the effect of reducing sow confinement pre-partum and applying confinement prior farrowing on farrowing performance and piglet mortality compared to loose housed sows. Sows were allocated to one of two treatments: 1) OPEN: sows were housed in an open swing-sided pen, and farrowed naturally, 2) CLOSED: sows were housed in an open swing-sided pen until 8am on the day of farrowing and the pen remained closed thereafter, and farrowing was induced with synthetic prostaglandin. Inter-piglet birth intervals, stillborn number and total live born piglet mortality were similar between treatments. CLOSED sows had less piglets die due to overlay (P<0.01). Reducing sow confinement pre-partum and applying confinement prior to farrowing, with the use of farrowing inducement, can achieve similar farrowing performance and reduce overlay mortality compared to loose housed sows.

Introduction

There is increasing concern about the welfare implications for sows housed in farrowing crates during farrowing and lactation because the restrictive environment prevents a number of behaviours, in particular the performance of nesting behaviours prior to farrowing (Barnett et al. 2001). Restricted nest building behaviour, due to space restriction prior to farrowing, is thought to cause an increased stress response and impair oxytocin release in the sow (Lawrence et al. 1994), resulting in prolonged farrowing durations and an increase in the number of stillborn piglets compared to loose housed sows (Oliviero et al. 2010). While sow loose housing systems have the potential to improve sow welfare they have been associated with an increase in live born piglet mortality compared to confinement systems (Hales et al. 2014; Marchant et al. 2000), primarily due to an increase in overlay caused mortality. This experiment investigated whether loose housing a sow in the pre-partum period to allow nesting behaviour and then confining the sow prior to farrowing can result in similar inter-piglet birth intervals stillborn mortality and reduce overlay caused live born piglet mortality compared to loose housed sows.

Materials and Methods

Multiparous sows were allocated to one of two treatments: 1) OPEN: sows were housed in an open swing-sided pen for the entire period, and farrowed naturally (n = 32), 2) CLOSED: sows were housed in a swing-sided pen with the pen open until 8am on the day of farrowing (day 114 of gestation) and remained closed thereafter, and farrowing was induced with synthetic prostaglandin (Juramate; Jurox, Australia) (n = 22). Farrowing was induced in the CLOSED treatment so that farrowing occurred on a known day, allowing the confinement protocol to be achieved. The swing-sided pen measured 2.8x1.8m (Figure 1) and no nesting materials were supplied.

Piglet mortality and cause were recorded from farrowing until day three post-partum. The cause of mortality was determined using the following definitions. Piglets with a white appearance and periople on hooves were determined as ‘stillborn’, those with visible signs of crushing were determined as ‘overlay’ and all other piglets that died were recorded as ‘other’. The inter-piglet birth intervals were recorded for a subset of sows from each farrowing treatment (15 sows/ treatment).

Figure 1. Diagram of the swing-sided pen. Diagram is not drawn to scale.

All analyses were performed using SPSS, V 21 and data expressed as means ± SEM. The sow was the experimental unit. Average number of piglets born alive and inter-piglet birth interval were analysed using a general linear model, with replicate and treatment as fixed effects and sow parity and total litter size as covariates. Number of stillborn piglets and live born mortality were analysed using a generalised linear model with a poisson distribution because data were not normally distributed. The model included replicate and treatment as fixed effects and sow parity and total litter size as covariates. Statistical significance between groups was
The number of total and live born piglets was not different between treatments, and averaged 12.6 ± 0.4 and 11.9 ± 0.3 piglets per sow, respectively. There was no difference in inter-piglet birth intervals between treatments (open: 23.1 ± 2.2 vs closed: 20.8 ± 3.6 min; P = 0.13). There was no difference in stillborn mortality or total live born mortality from birth until day three post-partum between treatments (Table 1). Sows in the CLOSED treatment had less live born piglets die due to overlay from birth until day 3 post-partum compared to the OPEN sows (P = 0.002). Sows in the OPEN treatment had less live born piglets die due to other causes from birth until day 3 post-partum compared to the CLOSED sows (P = 0.01).

<table>
<thead>
<tr>
<th>Number piglets/litter,</th>
<th>OPEN</th>
<th>CLOSED</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stillborn</td>
<td>0.45 ± 0.13</td>
<td>0.42 ± 0.15</td>
<td>0.85</td>
</tr>
<tr>
<td>Overlay</td>
<td>1.43 ± 0.22</td>
<td>0.57 ± 0.16</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Other</td>
<td>0.32 ± 0.10</td>
<td>0.85 ± 0.21</td>
<td>0.01</td>
</tr>
<tr>
<td>Total live born mortality</td>
<td>1.77 ± 0.24</td>
<td>1.41 ± 0.28</td>
<td>0.32</td>
</tr>
</tbody>
</table>

The similar inter-piglet birth intervals and stillborn number between the treatments, may suggest that allowing the sow space to perform nesting behaviours prior to confinement during farrowing may be able to reduce the stress response in the sow and consequently achieve similar farrowing performance as loose housed sows.

The live born piglet mortality results show that while there was a reduction in overlay piglet mortality in the CLOSED treatment, this did not result in a decrease total piglet mortality, due to an increase in other causes of piglet mortality compared to the OPEN treatment. This may suggest that reduced confinement housing systems have the potential to achieve similar performance outcomes in terms of live born piglet mortality, compared to confinement systems. However, the live born piglet mortality in this experiment was only recorded until day three post-partum. While the majority of piglet mortality is observed during this period (Marchant et al. 2000), it is possible that the incidence and cause of live born piglet mortality beyond day three post-partum could have effected total piglet mortality. Alternatively, the use of inducement may have contributed to an increase in the other causes of mortality in the CLOSED treatment, however it is generally understood that inducing farrowing in sows has no effect on live born piglet mortality (Kirkden et al. 2013).

In conclusion, reducing sow confinement during the pre-partum period and then applying confinement prior to farrowing, with the use of a swing-sided farrowing pen and farrowing inducement, can achieve similar stillborn mortality and reduce the incidence of overlay caused live born piglet mortality compared to sows that are loose housed continuously in a swing-sided pen.

Acknowledgement
This research was supported by Pork CRC Limited Australia.

References