The Productivity and Behaviour of Sows and Piglets Housed in Farrowing Pens with Temporary Crating or Farrowing Crates

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Abstract

Pen-based alternatives to farrowing crates have been researched for decades, in an effort to improve the welfare of farrowing and lactating sows. However, high piglet mortality, and a lack of commercially-relevant studies, has been a barrier to the acceptance of these systems in the pork industry. The purpose of this thesis was to compare the performance and behaviour of sows and piglets in farrowing pens with temporary crating, and in farrowing crates, in a commercial setting. In the first study, sows were housed in either a farrowing crate from 5 days pre-farrowing until weaning at 28 days; or in a pen where sows were crated from 3 days pre-farrowing until the 4th day of lactation. The farrowing system (crate or pen) from which a sow was weaned had no effect on subsequent reproductive performance. However, pre-weaning piglet mortality was significantly higher in pens (10.2%) than in crates (6.1%).

Sow and piglet behaviour was studied during the first 6 days post-farrowing in the second study. Sows in crates were confined throughout this observation period, whereas sows in pens were crated for days 1 – 3 post-farrowing and loose in the pen during days 4 – 6 post-farrowing. There was no difference between systems for the amount of time sows spent lying or standing during days 1 – 6, though sows in pens were more active once they were loose. Penned sows touched and investigated their piglets more once they were loose, compared to when they had been crated. There were few differences in piglet behaviour between farrowing systems.

The influence of the birth and rearing location (crate or pen) on gilt behaviour was examined in the third study. Gilts were identified as having been born and reared in a

farrowing crate or in a pen. Gilts and their piglets were observed during the first three days after giving birth in the system they were born and reared in, or in the system they were not born and reared in. Gilts born and reared in pens with temporary crating touched and vocalised towards their piglets more than gilts born and reared in farrowing crates, irrespective of whether they farrowed in a crate or a pen. This finding has implications for the transmission of maternal behaviour.

The associations between sow behaviour, gilt behaviour and piglet behaviour were compared in farrowing crates and pens with temporary crating using the data of the second and third study. Some associations between sow and piglet behaviour changed when the sow was no longer confined in a crate. This finding could be the link that explains differences in the later behaviour of gilts that were reared in different systems. Future studies should focus on the transition period between a sow being crated and then let loose in a pen, to improve sow and piglet welfare in these systems.

Declarations

This thesis contains no material that has been accepted for a degree or diploma by the University or any other institution. To the best of my knowledge no material previously published or written by another person has been used, except where acknowledgement has been made in the text.

This thesis has been written with chapters formatted as papers for publication. Therefore there is some repetition of methods. Each chapter contains a full discussion and a complete list of references. The final general discussion chapter provides a succinct discussion of the key findings of this thesis. The published and submitted manuscripts include supervisors as co-authors; however for each chapter, I developed the experimental design, carried out data collection and performed data analysis, with the final manuscript being written with the direction of the co-authors.

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PhD Thesis, Massey University, New Zealand

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List of Abbreviations

NAWAC = National Animal Welfare Advisory Committee

ACTH = Adrenocorticotrophic hormone

HPA = Hypothalamic Pituitary Adrenal (axis)

ABN = Arched-back nursing

LG = Licking and grooming

C = Farrowing crate

P = Pen with temporary crating

PWM = Pre-weaning piglet mortality rate, expressed as a percentage

$PGF_{2\alpha}$ = Prostaglandin $F_{2\alpha}$

WSI = Wean to service interval

ADG = Average daily gain (birth to weaning)

AM1 = Observation session between 0800 – 0845

AM2 = Observation session between 0920 – 1100

PM1 = Observation session between 1230 – 1445

PM2 = Observation session between 1520 – 1600

CC = A gilt born and reared in a crate, which farrowed in a crate

CP = A gilt born and reared in a crate, which farrowed in a pen

PC = A gilt born and reared in a pen, which farrowed in crate

PP = A gilt born and reared in a pen, which farrowed in a pen

C1 = Crate, Period 1 (days 1 – 3 post-farrowing)

C2 = Crate, Period 2 (days 4 – 6 post-farrowing)

P1 = Pen, Period 1 (days 1 – 3 post-farrowing)

P2 =Pen, Period 2 (days 4 – 6 post-farrowing)

P_{day} = P value for the main effect of the day of observation

P_{system} = P value for the main effect of the farrowing system (crate or pen with temporary crating)

P_{born} = P value for the main effect of the location where a gilt was born and reared (crate or pen with temporary crating)

P_{farrow} = P value for the main effect of the location where a gilt farrowed (crate or pen with temporary crating)