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Effect of Sow Lactation Crate Size on Litter Performance and Survivability

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Effect of Sow Lactation Crate Size on Litter Performance and Survivability

Abstract

A total of 529 litters of pigs (PIC TR4 × (Fast LW × PIC L02)) were used to examine the effect of sow lactation crate size on nursing pig litter performance and survivability. The sow portion of the farrowing crate was maintained at a constant length and width of 7.4 and 2.0 ft, respectively. To form the treatments, crate width was adjusted accordingly, taking space away from one sow's crate to give it to another allowing for 3 crate widths: 4.8 (small), 5.4 (medium), and 6.0 ft (large). This allowed for blocks of 3 crates, where each treatment was represented. Sows were loaded into individual lactation crates at random, balancing for parity across treatments. Cross fostering occurred within 24 h of farrowing prior to obtaining d 1 litter weight in effort to equalize litter size across treatments. Data were analyzed using generalized mixed models where treatment was a fixed effect and block was a random effect. Born alive, piglets weaned, and pre-weaning mortality, were all fitted using a binomial distribution.
Regardless of treatment, there was no evidence of differences in total piglets born (14.3), percentage of piglets born alive (92.3%), d 1 litter weight after cross fostering (40.0 lb), litter weaning weight (145.9 lb), litter ADG (5.4 lb/d), or number of piglets weaned (10.7). In addition, no evidence for differences was observed in the percentage piglets weaned (80.9%) or pre-weaning mortality (19.1%). In conclusion, increasing lactation crate size did not impact litter performance or pig survivability in this study.

Keywords

lactation, lactation crate size, sow

Cover Page Footnote

Appreciation is expressed to New Fashion Pork (Jackson, MN) for providing the animals and research facilities, and to Ben Clark for technical assistance.

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K-STATE Research and Extension

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Effect of Sow Lactation Crate Size on Litter Performance and Survivability[1]

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Summary

A total of 529 litters of pigs (PIC TR4 × (Fast LW × PIC L02)) were used to examine the effect of sow lactation crate size on nursing pig litter performance and survivability. The sow portion of the farrowing crate was maintained at a constant length and width of 7.4 and 2.0 ft, respectively. To form the treatments, crate width was adjusted accordingly, taking space away from one sow's crate to give it to another allowing for 3 crate widths: 4.8 (small), 5.4 (medium), and 6.0 ft (large). This allowed for blocks of 3 crates, where each treatment was represented. Sows were loaded into individual lactation crates at random, balancing for parity across treatments. Cross fostering occurred within 24 h of farrowing prior to obtaining d 1 litter weight in effort to equalize litter size across treatments. Data were analyzed using generalized mixed models where treatment was a fixed effect and block was a random effect. Born alive, piglets weaned, and pre-weaning mortality, were all fitted using a binomial distribution.

Regardless of treatment, there was no evidence of differences in total piglets born (14.3), percentage of piglets born alive (92.3%), d 1 litter weight after cross fostering (40.0 lb), litter weaning weight (145.9 lb), litter ADG (5.4 lb/d), or number of piglets weaned (10.7). In addition, no evidence for differences was observed in the percentage piglets weaned (80.9%) or pre-weaning mortality (19.1%). In conclusion, increasing lactation crate size did not impact litter performance or pig survivability in this study.

Introduction

Improvements in genetics and sow management have increased productivity goals, with pigs weaned per sow per year targeted to be more than 30 pigs in some of today's most prolific sow herds. Not only do we have more piglets in the farrowing crate but they remain in the farrowing crate for a longer period of time as lactation length is increased. The combination of larger litters and heavier pigs might require more space than the traditional farrowing crate configuration. Typically, sows are housed in a crate that is 7 ft long and 5 ft wide that includes 2 ft of width for the sow and 3 ft of width for the

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creep area. Intuitively, lactation crates with a larger area for the piglets may increase litter weaning weight and decrease pre-weaning mortality; however, there are no published data to support this hypothesis. Therefore, the objective of this experiment was to determine the effects of increasing farrowing crate space allowance for nursing pigs on litter performance and survivability.

Procedures

The Kansas State University Institutional Animal Care and Use Committee approved the protocol used in this experiment. The study was conducted at a commercial swine farm in southern Minnesota from May to October of 2016. The facility was totally enclosed, and environmentally regulated. Two farrowing rooms, each containing 4 rows of 12 crates, were used in the study. The experiment was designed with 3 treatments where farrowing crate length was maintained at 7.4 ft and there was a constant width of 2.0 ft for each sow. The creep area width was adjusted to allow for treatments with crate widths of 4.8 (small), 5.4 (medium), and 6.0 ft (large). To create each size of crate, the divider panels were adjusted accordingly. The area provided to the sow was maintained with changes only made to the area provided to the nursing pigs. Within a block of 3 consecutive crates, all treatments were represented. Sows were loaded into the individual lactation crates at random, balancing for parity across treatments.

A total of 529 litters of pigs (PIC TR4 × (Fast LW × PIC L02)) were used in this study, allowing for 176 litters per treatment, respectively. Response variables collected include total born and born alive, d 1 litter weight, weaning weight, litter ADG, and piglet death loss. Cross fostering occurred, regardless of treatment, within 24 h of farrowing in an effort to equalize litter size across treatments. Litters of fewer than six piglets were not used in this study. Day 1 litter weight was then obtained after cross fostering was completed. Individual piglet weights were not obtained. Litter weaning weight was obtained on d 19.6 of lactation. Sows had ad libitum access to water upon entry to the farrowing house, but were limit-fed until farrowing. Creep feed was not provided during the study.

Data were analyzed using generalized mixed models where treatment was a fixed effect and block served as a random effect using PROC GLIMMIX in SAS version 9.4 (SAS Institute, Inc., Cary, NC) with sow crate serving as the experimental unit. Born alive, piglets weaned, and pre-weaning mortality were all fitted using a binomial distribution. Significance levels were set at $P \leq 0.05$ and marginally significant between $P > 0.05$ and $P \leq 0.10$.

Results and Discussion

Average lactation length in this study was 19.6 d and average parity was 2.6. Regardless of treatment, there was no evidence for differences in the total piglets born or percentage of piglets born alive (Table 1; $P > 0.10$). Day 1 litter weight was 40.1, 40.0, and 39.8 lb for the small, medium, and large lactation crates, with no evidence for differences among treatments ($P > 0.10$). Litter weaning weight was 144.8, 148.6, and 144.2 lb for the small, medium, and large lactation crates, with no evidence for differences among treatments ($P > 0.10$). Although there was a numerical decrease in the number of pigs weaned from the small to the large lactation crate, there was no evidence for dif-

ferences among treatments ($P > 0.10$). Pre-weaning mortality was 18.4, 18.9 and 20.1% for the small, medium, and large lactation crate size with no evidence ($P > 0.10$) for differences among treatment groups. It is important to note that pre-weaning mortality was higher than this farm's historical average due to an outbreak of porcine epidemic diarrhea virus 16 weeks before the study started. It is not known if this condition affected the results of this study.

In summary, regardless of treatment, there was no evidence of differences in total piglets born, percentage of piglets born alive, d 1 litter weight, litter weaning weight, or litter ADG. In addition, no evidence for differences was observed in the percentage of piglets weaned or pre-weaning mortality. Increasing lactation crate size did not impact litter performance or pig survivability in this study.

Table 1. The effect of lactation crate size on litter performance[1,2,3]

	Sow lactation crate size, ft[4]				
Item	7.4 × 4.8	7.4 × 5.4	7.4 × 6.0	SEM	Probability, $P <$
Sows per treatment, n	178	175	176	---	---
Total piglets born, n	14.7	14.1	14.2	0.253	0.154
Born alive, % of total born	91.5	93.1	92.2	0.593	0.103
Litter size after equalization, n	13.3	13.2	13.1	0.182	0.786
Day 1 litter weight, lb	40.1	40.0	39.8	0.591	0.941
Litter weaning weight, lb	144.8	148.6	144.2	2.739	0.466
Litter ADG, lb	5.3	5.5	5.3	0.099	0.326
Piglets weaned, n	10.8	10.7	10.4	0.159	0.194
Piglets weaned, %	81.6	81.1	79.9	0.969	0.322
Pre-weaning mortality, %	18.4	18.9	20.1	0.969	0.322
Lactation length, d	19.6	19.6	19.5	0.239	0.919

[1] A total of 529 litters of pigs (PIC TR4 × (Fast LW × PIC L02)) were used in this study.

[2] Average parity for females (Fast Large White × PIC Landrace) was 2.6.

[3] Results were considered significant at $P \leq 0.05$ and marginally significant between $P > 0.05$ and $P \leq 0.10$.

[4] Farrowing crate length and width for the sow area were maintained at 7.4 and 2.0 ft, but the creep area on either side of the farrowing crate was adjusted to allow for treatments with total crate width of 4.8, 5.4, and 6.0 ft.