

Maternal Behavior Potentially Affecting Offspring Survivability: a Comparison Between Meishan and Yorkshire X Landrace (YL) Sows

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Summary and Implications

This study was designed to examine differences in maternal behavior between two breeds, the Meishan breed from China and the Yorkshire/Landrace (YL) cross. This was a preliminary trial aimed at gathering data to appropriately design a more extensive study. Identification of maternal behavioral contributions to piglet survivability may assist in reducing production losses caused by the sow.

Introduction

Despite all efforts, piglet losses caused by maternal crushing continue to be a major economic concern for the swine industry. In the United States, losses due to crushing in 1993 were approximately \$120 million. This economic cost was calculated using USDA production data and a conservative crushing rate of 5% (Svendsen et al., 1986). The Meishan breed from China was chosen for the comparison because these sows are characterized as having large litters with low birthweights. In addition, these litters have high survival rates, up to 5% greater than Large Whites (Bidanel et al., 1990). The YL cross was chosen to represent a typical commercial sow. In contrast to commercially raised sows, reportedly few Meishan sows lie on their piglets. Sellier and Legault (1986) attributed the Meishans' large litter advantage to a lower embryonic mortality rate. Neonatal fatalities remain similar to commercial breeds despite the Meishans' large litters of tiny piglets. While these characteristics may seem to predispose a sow to lose piglets, the specific factors responsible for the lower incidence of crushing by Meishans are unknown. Therefore, the objective of this preliminary trial was to examine the role of maternal behavior in piglet survivability. While concentrating on the maternal side of the equation, additional factors such as piglet behavior also were identified for investigation in future studies.

Materials and Methods

Four YL sows were housed in 0.6 x 1.7 meter crates. Three Meishan sows were housed in 0.6 x 2.1 meter pens. These multiparous sows were left in the systems in which they had farrowed previously to avoid possible treatment

attributed to new environments. Time-lapse photography was used to record the sows' behaviors. Sows were videotaped continuously for 48 hours from the initiation of parturition which was defined as beginning after the birth of the first piglet. The time each sow spent lying, kneeling, sitting and standing was recorded if the duration of the behavior was greater than five seconds. A position change was recorded if the time measured less than five seconds. Position changes, head turns, and false starts also were recorded. Position change was defined as switching to either sitting, standing, lying, or altering the lying position between lateral and sternal. This was used as an indicator of the sows' activity. A head turn was defined as moving the head right or left before lying down. This behavior may indicate an effort to look for nearby piglets. A false start was defined as attempting to lie down but not completing this action. A sow may stop a position change in response to a vocalization from a piglet. Production data recorded included piglets crushed, piglets born alive and piglets stillborn. The Wilcoxon-Mann-Whitney test was used to compare differences between breeds.

Results and Discussion

Durations of farrowing, as well as lying, standing, position changes, head turns, false starts, and piglets born alive and crushed did not differ between treatments ($P > .3$; Table 1). Kneeling (2.4 vs. 0 ± 0.6 minutes), sitting (42.4 vs. 11.0 ± 9.0 minutes), and stillborn piglets (1.5 vs. 0 ± 0.6) were greater in YL than Meishan sows ($P = .03$, $P = .08$, $P = .08$ respectively; Table 2).

Table 1. Behavior comparison.

	MEISHAN	YL
Farrowing (minutes)	168.9	258.4
Lying (minutes)	2,712.7	2,504.1
Standing (minutes)	155.3	239.8
Kneeling (minutes)	0.0 ^a	2.4 ^b
Sitting (minutes)	11.0 ^a	42.4 ^b
False starts (#)	0.7	1.8
Head turns (#)	28.0	22.8
Position changes (#)	66.7	98

^{a,b}Means within the same row with different superscripts differ ($P < .08$).

Table 2. Production data.

	MEISHAN	YL
Crushed (#)	0	0.8
Liveborn (#)	10.3	9
Stillborn (#)	0.0 ^a	1.5 ^b

^{a,b} Means within the same row with different superscripts differ ($P < .08$).

Although Meishans are reportedly better mothers, we found no difference in the number of piglets crushed or liveborn. This was a preliminary trial, thus results may differ once the sample size has increased. This study was confounded both with breed and confinement system. Therefore, conclusions cannot be attributed to either exclusively. However, several important inferences were determined.

Crates were designed to reduce the number of piglets crushed by limiting space for the sow, thus the Meishan sows that were allocated additional space in pens were expected to have a greater opportunity to crush piglets. In addition, the Meishan sows' characteristics of large litters with low birthweights should increase the potential of crushing. However, the Meishan sows in this study did not crush more piglets. The kneeling and sitting behaviors performed for longer periods by YL sows may indicate they were less comfortable in crates than the Meishan sows housed in pens. More time spent in these positions with close proximity to piglets may contribute to neonatal mortality and a greater incidence of stillbirths. This is in agreement with Cronin et al. (1996).

Additional factors identified as influencing the number of piglets raised to weaning age included the following: piglet behavior and the time spent lying at the udder compared to utilization of the piglet space; confinement system and its effect on swine comfort and welfare; genetic influence and its importance in behavior. Additional research is warranted to examine the maternal bond and its expression by different breeds. Moreover, investigation of different confinement systems and their influence on the variation of both sow and piglet behavior should be resolved. The swine industry will profit from a better understanding of maternal behavior as it relates to piglet mortality.

References

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