

Summary: The role of environmental enrichment and back fat depth in the intensity of aggressive behavior performed by sows during the establishment of the dominance hierarchy

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Key Findings:

- This study estimated the effect of providing sows with an IMPROVED pen environment (straw in racks and ropes) on aggressive behavior after mixing, compared to a typical minimal enrichment gestation system (CONTROL).
- Sows in the CONTROL pens performed more fighting behavior compared to the IMPROVED sows at 3 weeks post-mixing.
- Sows with a low back fat thickness initiated more aggressive behaviors.

Introduction

For sows introduced into new groups, the aggressive behavior associated with establishing a social hierarchy represents a period of severe stress. Environmental enrichment effectively reduced post-mixing aggression in weaner and finisher pigs. This study aimed to investigate the effect of providing sows with an improved pen environment (straw in racks and ropes) on aggressive behavior after mixing and to understand the role played by sow back fat thickness and parity order.

Material & Methods

The study was carried out on a commercial 2000-sow farrow-to-finish farm in Co. Cork, Ireland. In total, 240 Large White X Landrace sows were used in the study (6 replicates/treatment, 20 sows/replicate) between July 2021 and November 2021. At 29 days post-service, sows were mixed into IMPROVED or CONTROL pens with individual feeding stalls. In the CONTROL pen, sows were moved to a fully slatted gestation pen with two rows of ten individual free-access feeding stalls, in which two blocks of wood on chains and two simple chains were provided as enrichment in the middle of the loose slatted area. In the IMPROVED pen, sows were moved to similar pens but in which the floors of the feeding stalls were covered with rubber mats, in the middle of which a rooting tower holding straw was mounted. A straw rack was also mounted on the gates of the pen at either end of the loose area and suspended above a steel collection plate on the floor. Manila ropes were suspended at a height of one meter within each feeding stall. The racks were filled with straw each day throughout the trial, while manila ropes were replaced as often as necessary to provide continuous access. Aggressive behaviors were monitored for two hours at three times: immediately after mixing (T0), 24 h post-mixing (T1) and 3 weeks post-mixing (T21). The back fat thickness (BFT) was recorded at 25 days post-service. BFT was measured at the last rib, 6 to 7 cm off the midline on the left and right side (P2 position).

Results

Overall, the sows in the CONTROL pens performed more fighting behavior compared to the IMPROVED sows ($p < 0.001$). This difference was significant only at T21 ($p < 0.001$, Figure 1). Additionally, the sows in the CONTROL pens generally initiated more aggressive behaviors than the sows in the IMPROVED pens ($p = 0.02$, Figure 2).. The sows with a low back fat thickness initiated more aggressive behaviors, regardless of the environmental complexity. Parity order had no significant effect on any of the aggressive behaviors assessed.

Discussion

The results of this study suggest that aggression at mixing is unavoidable and, indeed, is essential to ensuring the establishment of the dominance hierarchy and thereby achieving group stability. Nevertheless, optimal enrichment materials could have a beneficial effect on at least reducing its frequency.

On 21 days after mixing, there were significantly more fights in the control pens than there were in the improved pens, and the reduction in the frequency of fights between day 1 and day 21 was faster in the latter pens. This indicates that environmental enrichment has an important role later, when the social hierarchy was established.

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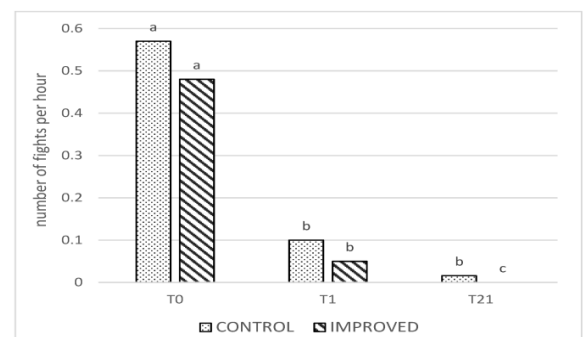


Figure 1. Number of fights per hour in the CONTROL and IMPROVED pens on the day of mixing (T0), the day after mixing (T1), and three weeks later (T21). a, b, c: Different letters indicate significant differences ($p < 0.05$) between the treatment and time.

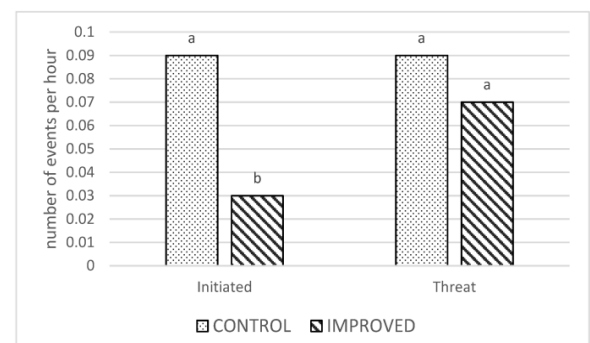


Figure 2. Number of initiated aggressive behaviors and threats per hour in the CONTROL and IMPROVED pens. a, b: Different letters indicates significant differences ($p < 0.05$) between treatments.