

Effects of Temperament and Floor Space Allowance on Sows at Grouping

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SUMMARY

Many N. American producers are anticipating a change to group housing for sows. The overall purpose of this study was to determine how to reduce the stress of mixing sows by altering space allowance, and social groups. We also studied how space can influence behaviour and aggression within a group. The largest space requirement occurred between midnight and 8am when the highest percentage of sows were lying laterally. From a purely physical perspective the sows would require 1.51m²/sow, however this does not account for any movement or interactions between individuals. When sows were initially grouped, they showed a higher occurrence of injury scores ($P < 0.001$) and a greater number of fights ($P < 0.001$) compared to the stable groups (3 weeks post-mixing). Most fighting and injuries occurred within 24 hours of mixing. There was not a significant difference between either injury score and number of fights with the different space allowances. Passive/shy sows appeared to show a reduced stress response compared with active/bold sows.

INTRODUCTION

With the announcements in 2007 by the largest producer/packers in both the USA and Canada that they will transition their production facilities to group housing for sows over the next ten years, many producers are anticipating a change to group housing. Previous studies have demonstrated that spacious accommodation reduces the aggression at regrouping and general health during gestation, but the studies did not identify the point at which crowding begins (i.e. space is important, but the specific requirement is unknown). This study was undertaken with the goal of establishing a more precise value. In addition to providing enough space, the temperament of sows was also determined to ascertain if 'shy' or 'passive' sows would be less aggressive than 'bold' or 'active' sows. Specifically, we also

wanted to determine the space required to accommodate the postures of sows exhibited over a 24 hr period, the space required to decrease aggression at mixing, space required to accommodate normal behaviour patterns in sows after a stable social structure has been established and to determine if grouping sows with specific behavioural characteristics minimizes the aggression in group housing.)

MATERIALS AND METHODS

Sixteen groups of 8 sows were formed based on their behavioural responses to two simple temperament tests ($n=128$). The groups were either described as being uniform 'passive/shy' or uniform 'active/bold'. Sows were confined to the loafing area for 23 hours per day and returned to the stalls for feeding. The gestation pens used

“When mixing gestating sows most fighting occurred within 24 hours of mixing, although no differences between space allowance”

for the study consisted of 32 walk-in/lock-in stalls and a loafing area. Moveable panels were used to create the required space allowances of 1.6 m²/sow; 2.0 m²/sow; 2.4 m²/sow; and 2.8 m²/sow. Aggressive behaviours were observed live for 4 hours after the sows were initially mixed. Photographs were also taken from mounted cameras at regular intervals for 72 hours post mixing. Injuries were



Sows locked out of stalls and confined to loafing area

assessed and saliva samples were collected before mixing (baseline) then again at 24 hours and 72 hours post-mixing from 4 focal sows per group. At the end of the 'mixing week', sows were weighed before they were locked into their feeding stalls for one week. At the beginning of the third week, sows entered their new space allowance and stayed there for four weeks, this is referred to as the 'stable weeks'. The sows had their injuries assessed and saliva collected before entering their new space allowance. Live observations of aggressive behaviour were again recorded for 4 hours. Injuries were assessed and saliva samples were also collected again. This same procedure was followed at the end of the four stable weeks. Photographs were taken every 10 minutes for 24 hours at week 1, week 4 and week 10 in order to assess postural behaviour changes over time.

RESULTS AND DISCUSSION

On average, over a 24 hr hour period we observed that 17.2% of sows would be standing, 2.1% sitting, 9.6% lying on sternum, 28% lying relaxed on sternum, and 43.1% lying laterally. These results were consistent over the 'mixed' and 'stable' weeks throughout different stages of gestation (Fig. 1). Using calculations of the total area occupied by sows displaying each of these postures from Ekkel et al, (2003) we calculated how much space would be required for sows over a 24 hour period. The average weight of all the sows involved in the study was 230kg. We used this weight to calculate what the total space requirement would be over 3 different times over a 24hr period from the postural observations. The 3 periods were 1: midnight – 8am, 2: 8am – 4pm, 3: 4pm – midnight. These space requirements only account for the physical space occupied by sows and does not take the space required for social interactions or free space into consideration. This example shows that sows require the most amount of space between midnight and 8am

as this is when the most amount of lateral lying occurs. The least amount of space is used during the day (between 8am and 4pm).

When sows were initially grouped, they showed a higher occurrence of injury scores ($P < 0.001$) (Fig. 2) and a greater number of fights ($P < 0.001$) compared to the stable groups. Most fighting and injuries occurred within 24 hours of mixing, and was consistent across all 4 space allowances (Fig. 3). Sows in the stable groups showed a higher occurrence of threats than the mixed groups. This is likely to be because the aggression would be highest when unfamiliar pigs are first introduced. After a period of time the aggression becomes ritualized (in the form of threats). Threats do not escalate into physical contact due to an established dominance hierarchy. There was not a significant difference between injury score and number of



Walk-in/Lock-in stall group housed sows

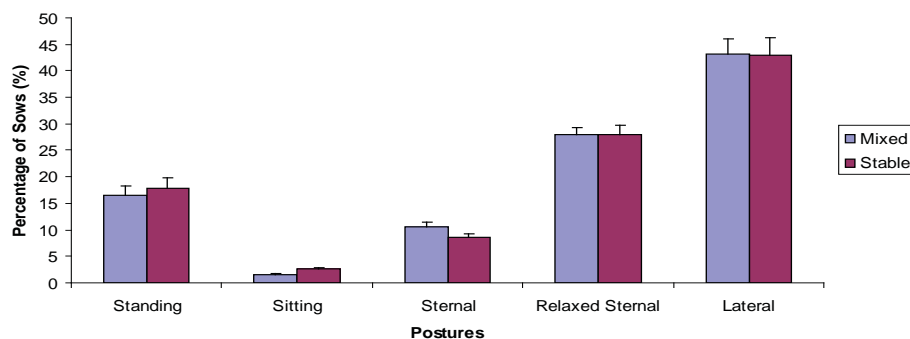


Figure 1: Postural behaviours of sows between 'mixed' and 'stable' phases.

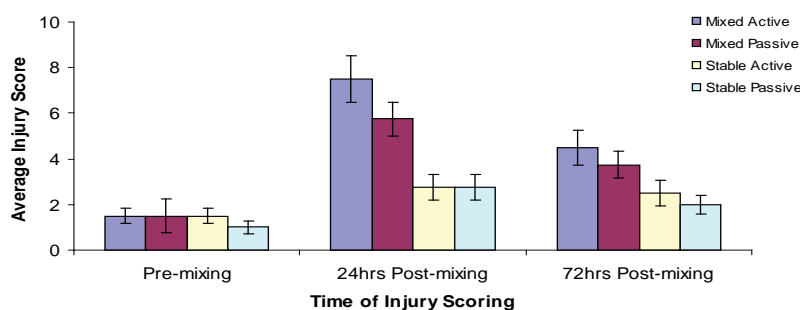


Figure 2: Injury scores of prior to being mixed (0hrs) and 24hrs, 72hrs after being 'mixed' and when 'stable' for both 'active' and 'passive' temperament traits.

fighters with the different space allowances. Grouping sows with different behavioural characteristics does appear to minimize aggression as passive animals had lower injury scores and were involved in less fights, however these results did not indicate a significant difference. Passive animals also had lower cortisol levels (Fig 4), indicating that they may be experiencing less stress than the 'active' sows.

CONCLUSION

Aggression and poor control over feed intake of sows in groups are the main reasons for using gestation stalls. Even though these problems still exist in group housing, producers are moving away from stalls and towards groups. Further information is still required to be able to provide advice group housing on to promote the welfare of the sows and the profitability of the producer. Most fighting and injuries occurred within 24hrs of mixing,

although no difference was found between space allowances. 'Passive' or 'shy' sows are more likely to be suited to group housing than 'active' or 'bold' sows as they had lower injury scores and had lower levels of salivary cortisol. The walk-in/lock-in stalls used in this study were locked off for 23hrs and only opened for 1hr per day for feeding – similar to a cafeteria system. The results described here specifically relate to this type of group housing and can not necessarily be inferred for other group housing systems.

ACKNOWLEDGEMENTS

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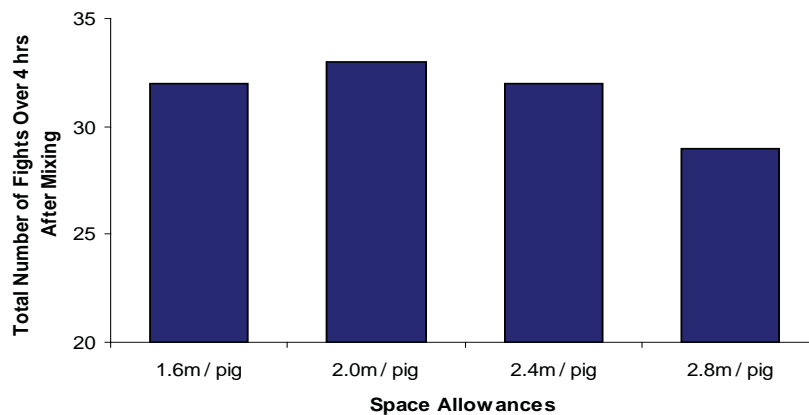


Figure 3 Effect of space allowance on the total number of fights recorded over 4 hours after mixing. The treatments assessed during the mixing period (first week sows were grouped together) were 4 different space allowances 1.6 m²/sow, 2.0 m²/sow, 2.4 m²/sow, 2.8 m²/sow.

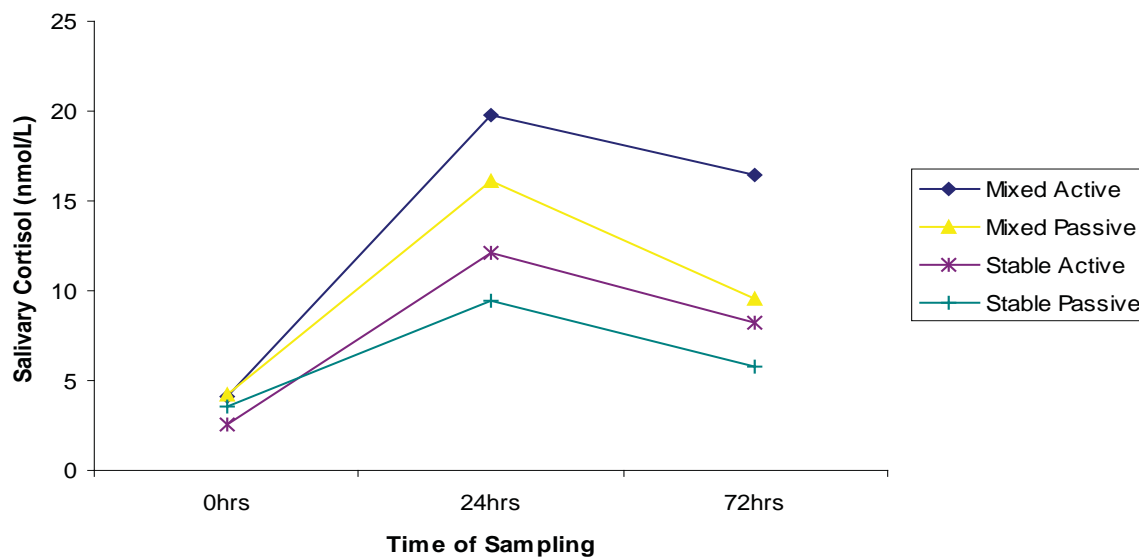


Figure 4 Salivary cortisol of sows prior to being mixed (0hrs) and 24hrs, 72hrs after being 'mixed' and when 'stable' for both 'active' and 'passive' temperament traits.