Weaning Sows Directly into Group Housing: Aggression, Welfare & Production

Y.M. Seddon, M.M. Bouvier, S.A. Ethier, Y.Z. Li[1] and J.A. Brown

Yolande Seddon

Jennifer Brown

SUMMARY

Social stress from mixing sows has the potential to negatively affect sow production and welfare. Housing sows in stalls from weaning until five weeks after breeding is a common strategy used to prevent aggression and ensure control over individual feeding during breeding, conception and implantation. However, alternative management options are needed as pressure to reduce stall use is likely to continue. This study compared the effects of three mixing strategies on sow performance in group sow housing. Treatments included: Early mixing (EM) - sows mixed directly at weaning; Pre-socialisation (PS) - sows mixed for two days at weaning, then stall housed for breeding and until five weeks gestation, then remixed; and Late mixing (LM) - sows stall-housed at weaning and mixed into groups at five weeks gestation. The results show no differences in the aggressive behaviour among treatments. Analysis of production showed a lower conception rate in LM groups than in EM and PS groups $P<0.05$. There were no differences in total born, piglets born alive or mummies among treatments, but a there were significantly fewer stillborn piglets in the EM treatment. Fewer stillborn piglets may have resulted from improved fitness and/or activity levels during early gestation. Overall, sows performed similarly in all treatments indicating that, under good management conditions, mixing sows at weaning does not impact sow performance or welfare.

"Early mixing sows performed equally to sow in other mixing treatments."

INTRODUCTION

Canadian producers are under increasing pressure to manage gestating sows in groups rather than stalls. The 2014 Canadian Code of Practice for the Care and Handling of Pigs requires that as of July 1st 2014, all newly built or renovated barns must house sows and gilts in groups. When managing groups, it is common to house sows in stalls during breeding and for a period of up to 5 weeks after breeding, however, pressure continues to reduce stall use. The effect of mixing sows at weaning is an area that has not been investigated extensively and there may be benefits to this practice that are generally overlooked. Mixing sows at weaning will give animals time to establish their social group before they cycle, avoiding any effects of mixing stress on sow conception rate. It was been suggested that mixing sows at weaning may disrupt the onset of estrus in sows. However, there is research to suggest that if mixing sows is acute it can stimulate quicker return to estrus in sows. Through allowing sows to display estrus behavior, there is also the potential to have a greater synchronization of estrus within a breeding group.

This project was designed to compare the effects of mixing sows at weaning, to minimize five weeks of gestation.

The main objectives were to:

1. Determine the effect of mixing sows at weaning vs. mixing at five weeks on reproductive performance, aggression and stress.
2. Evaluate whether pre-mixing sows for two days at weaning followed by breeding in stalls can reduce aggression or improve performance of sows that are grouped after implantation.

MATERIAL AND METHODS

A total of 252 gestating sows were studied over six replicates. Sows were group-housed in walk- in/ lock-in stalls, at 14 sows per pen, providing 2.29m² per sow in the group area. Each pen consisted of 16 gated free access stalls measuring 0.61m x 2.13m. with a fully slatted communal loafing area behind the stalls. Sows were fed 2.4 kg of a commercial sow ration in feeding stalls once per day. Heat detection, artificial insemination and pregnancy diagnosis took place in the free access stalls. Sows and piglets were weaned at approximately 28 days post-partum.

[1] West Central Research and Outreach Center- University of Minnesota, 46352 State Hwy 329, Morris, NM, 56267

Table 1. Means of aggressive interactions observed on days 1 and 2 after mixing in three mixing treatment (per group of 14 sows). Treatments: Early Mixing (EM); Pre-Socialization, first mixing (PS1); Pre-Socialization, second mixing (PS2); Late Mixing (LM).

	Treatment				
Behavior (totals), n = 18	EM	PS1	LM	SEM	P
Total aggressive interactions (sum of d1 and d2)	208.50	213.30	212.00	29.20	0.993
Threats per hour (day 1)	12.95	14.47	14.38	1.93	0.825
Head to head per hour (day 1)	1.87	1.77	2.13	0.65	0.918
Head to back per hour (day 1)	0.40	0.28	0.32	0.20	0.913
Percentage (%) of time spent in aggression (day 1)	3.20	2.54	3.55	0.75	0.637
Percentage (%) of time spent in aggression (days 1 and 2)	2.09	1.89	2.34	0.56	0.853
Behavior (totals)	EM	PS2	LM	SEM	P
Total aggressive interactions (sum of d1 and d2)	208.50	190.83	212.00	35.95	0.906
Threats per hour (day 1)	12.95	14.47	14.38	2.40	0.882
Head to head per hour (day 1)	1.87	1.00	2.13	0.60	0.405
Head to back per hour (day 1)	0.40	0.13	0.32	0.18	0.583
Percentage (%) of time spent in aggression (day 1)	3.20	2.21	3.55	0.79	0.477
Percentage (%) of time spent in aggression (days 1 and 2)	2.09	1.76	2.33	0.60	0.814

Table 2. Production characteristics of sows in three mixing treatments: Early Mixing (EM); Pre-Socialization (PS); and Late Mixing (LM), (total of 14 sows per pen, 6 replicates/treatment, total of 84 sows per treatment)

	Treatments			
Variable	EM	PS	LM	P
Conception rate (%)	98	94	87	<0.05
Wean to Service Interval (days)*	4.06	4.51	4.31	NS
Total born	15.16	15.63	15.47	NS
Born Alive	13.66	13.27	13.18	NS
Still born	0.95*a*	1.54*b*	1.58*b*	<0.005
Mummies	0.47	0.44	0.53	NS

NS = not significant. * Gilts excluded from analysis for wean to service interval.

Experimental treatments: The three treatments (Early Mixing [EM]; sows mixed directly into groups at weaning, Pre-socialisation [PS]; sows stall housed at weaning and mixed into groups at five weeks gestation; and Late Mixing [LM]; sows mixe for two days after weaning, then stall housed for breeding and up to five weks gestation, after which sow are remixed into the same groups) were studied over six replicates, with 14 sows per pen (84 sows per treatment). The EM and LM treatments evaluated two common management techniques, with LM acting as the control treatment to examine the interaction between mixing at critical time periods in combination with housing sows in stalls during the implantation period; it further determines if there would be any benefits, such as reduced aggression in the second mixing. The PS treatment was included as an intermediate treatment. Each group included a range of parities with parity balanced across treatments. When the treatment was required that sows be kept in stalls, the sows were locked into free access stalls. When the treatment required sows be loose in a group, sows were fed each morning in free access stalls, after which they were locked out of the stalls up to 22 hours/day.

Data collection: Sow productivity including litter characteristics, time to first service, conception rate (sows pregnant after first service), and farrowing rate were recorded. Individual body weight, back fat depth and body condition were recorded at weaning, at five weeks after breeding and again at sixteen weeks after breeding.

The behaviour of sows at the designated mixing times was recorded using video cameras suspended over the pen, and recording for two days after mixing. The number and duration of aggressive encounters was recorded. Sows in the EM treatment were observed for estrus behaviours including mounting attempts and flank nosing. Salivary cortisol was collected from four focal sows per group to assess the degree of stress induced by mixing.

Injuries resulting from aggression at mixing were assessed before and after mixing, and in weeks 5 and 16 of gestation. Sows were also scored for lameness at the same time points using the Zinpro Feet First® gait scoring system.

RESULTS AND DISCUSSION

Data collection was completed in early 2015 and an initial analysis of the sow production performance has been completed. Preliminary data on aggression at mixing from the first three replicates revealed no differences in the total time spent fighting, duration of fights, or frequency of threats.

There were no differences in aggressive interactions among any of the treatments when comparing the aggression observed in the first mixing for all treatments for the EM and LM mixing to the second PS mixing. It should also be noted levels of aggression observed in all three treatments were low. Over the two day period of observations a total of 32 minutes of aggressive behaviour were observed for 16 sows over a 17-hour observation period. This equate to eight seonds of aggression/sow/hour. The vast majority of aggressive encounters were threats (considered aggression) with relatively few physical fights (Table 2).

These behaviour results suggest that no one treatment was better at reducing aggression after mixing, and levels of aggression were generally very low. The longest total fight time for any group was 20 minutes, and this total was accumulated by 14 sows over two days of observation. There was a tendency for the frequency of head to head fights to be lower in the second PS mixing (PS2). However, with the PS group receiving two mixings and showing aggression at each, this could be considered a sub-optimal management strategy for sow welfare, as sows experienced mixing aggression twice in one gestation period.

Comparing the production results of sows, there were significant differences in conception rates across the three treatments. LM sows had the lowest conception rate at 87%, EM sows had the highest conception rate (98%), and PS sows were intermediate (Table 2). It is not clear why the LM treatment resulted in the lowest conception rate; this is the standard practice for the PSCI herd, and typically

achieves a conception rate over 90%. For the current study the lower conception rate of LM sows may reflect sub-optimal stimulation of estrus expression during stall housing. In comparison, the EM and PS groups both received mixing stress immediately after weaning, which may have stimulated follicular growth and enhanced estrus expression.

The EM treatment had significantly fewer stillborns than the PS or LM group. Fewer stillborn piglets in EM sows may have resulted from improved fitness and/or activity levels during early gestation. The similar numbers of stillborn in the PS and LM treatments, and lower number in the EM group, suggests that there is an influence from not being held in the stalls during the implantation period. Whether movement of the sows during the initial weeks of gestation can reduce the number of stillborn piglets should be investigated further. There were no differences among treatments in the wean to service interval, or other litter traits including total piglets born, born alive or mummified.

CONCLUSION

Results from this study indicate that all of the mixing treatments studied had similar levels of aggression, and that overall, mixing aggression occurred at a low level. In terms of production, the EM sows performed similarly, or better, than PS and LM sows, indicating that under good management conditions (eg. no competition at feeding) mixing sows at weaning does not negatively impact sow performance. The PS treatment investigated in this study had no production benefits, and exposed sows to mixing aggression twice during gestation. As such, it can be viewed as less optimal for management and welfare.

ACKNOWLEDGEMENTS

Strategic program funding provided by Sask Pork, Alberta Pork, Manitoba Pork Council, Ontario Pork and the Saskatchewan Agricultural and Food Development Fund. The authors gratefully acknowledge specific project funding for this study provided by the National Pork Board.