

CASE STUDIES ON GROUP HOUSING OF SOWS: THE ARKELL SWINE RESEARCH STATION FACILITY

**Tina Widowski, Monica Séguin and Dave Barney
Department of Animal and Poultry Science
University of Guelph**

INTRODUCTION

In the winter of 2000, one of the two gestation rooms at the Arkell Swine Research Station was converted from a 108, individually fed, dry sow stall set-up to a group housing facility with a floor feeding system. Over the last eight months, we have been collecting data on behaviour, health and performance measures of gestating sows/gilts housed at different space allotments in the group housing facility. In this presentation we will provide a description of the design and management of the facility and report preliminary data on productivity, body condition and lesion scores. For comparison, a summary of similar parameters collected from sows/gilts housed in standard gestation stalls at the station is included.

DESCRIPTION OF THE FACILITY

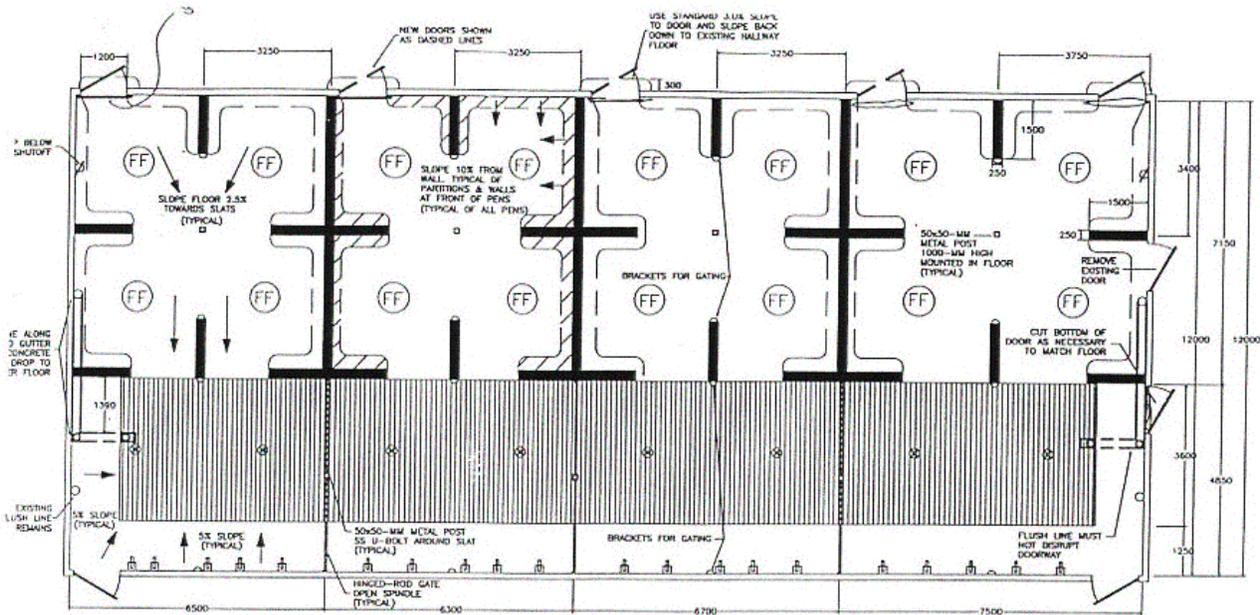
The group housing facility was designed with four pens ranging in size from 750 – 1015 ft² (Figure 1). The room had consisted of 3 rows of 36 stalls with a central alleyway and an alleyway at the back of each row of stalls. Currently, entry to each of the pens is from a central hallway of the barn eliminating any alleyways within the room and consequently, providing additional floor space in the pens.

Approximately one third of each pen has a slatted floor (dunging/watering area) where drinkers and overhead sprinklers are located. The other two thirds has a solid concrete floor that is sloped away from the walls and toward the dunging area (feeding/lying area). Cement block walls were used to separate the pens in lying/feeding area and spindle gates separate pens in the slatted dunging area. As can be seen in the figure, each pen has shorter walls jutting into it so as to divide it even further. These additional walls were designed to allow for the dropping of feed (FF) into four distinct areas of the pen to spread the distribution of feed and facilitate better access to feed for subordinate sows. The shortened walls were also intended to provide "hiding" areas for sows and to supply additional perimeter areas for sows to lie against.

The existing liquid manure system was used with only minor modifications that involved removing slats from where one row of stalls had been and joining the remaining two to form a large dunging area at the back of the pens. In order not to effect the structural integrity of the existing exterior wall, a narrow concrete area was left between the outside wall and slatted area. Originally, the nipple drinkers were placed along this wall to help keep the area wet and clean. We have subsequently added hanging drinkers over the slatted area. A timed sprinkler

system was installed above the slatted area that sprays water in a twelve-foot diameter. This encourages the sows to use the slatted area for dunging.

Figure 1. Layout of the pens in the Arkell Swine Research Station group housing facility.



We have further divided two of the four pens in half, in order to accommodate smaller groups of sows held at higher space allotments. The small pens (4 in total) range in size from 370 – 535 ft² and the two large pens are 756 and 785 ft², respectively.

BREEDING AND MANAGEMENT

The herd at the Arkell Swine Research Station is a pure Yorkshire line. Sows/gilts are housed in individual crates or in small groups (3-4 animals) in the breeding room. Approximately 14 sows and a variable number of gilts are bred each week, by artificial insemination, and kept there until confirmed pregnant at 35 days post breeding. Groups comprise either first parity gilts or mixed parity sows. After mixing, they are held in static groups until they are moved to the farrowing rooms.

For the purpose of this study, groups were mixed when the appropriate number of animals needed to form groups at the various space allotments had been confirmed pregnant. It is important to understand that accommodation of the three different space allotments requires that groups be of different sizes. The three space allotments that are being tested are 25, 30 and 35 ft² per animal. Group sizes range from 12 to 16 animals in the small pens and from 22 to 31 in the large.

Pelleted feed is distributed once a day (8-8:30am) by a drop feeding system into 2 separate piles (small pens) or 4 separate piles (large pens). The feed hoppers above the drop are adjusted according to group size to provide 2.5 kg/sow/day of the dry sow ration.

DATA COLLECTION

Sows/gilts are randomly assigned to the group housing or dry sow stall facility. They are housed in the group system for a maximum of 70 days at which time they are transferred to the farrowing wing. All sows/gilts are weighed and scored for body condition going in and out of the gestation housing. Body condition (ranging from 1-5) is scored closely following the scoring system described by Patience *et al.* (1995) (Table 1). Skin integrity is scored once they enter the facility, 24 hours post-mixing and on a weekly basis thereafter, for animals in groups and in stalls. A scoring system for lesions, abrasions and callouses was adapted from Hodgkiss *et al.* (1998) and de Koning (1984) (Table 2). Twenty-one body regions are examined: face, each ear, snout, chest, neck, each shoulder, each side of the loin and hip, the back, udder, hind, tail, vulva, and all legs. Qualitative features such as severity or 'age' (old or fresh wounds) are not documented. Production data are also being collected and include: number of liveborn piglets, number of stillborn piglets, number of mummies and average piglet weight at birth.

Table 1. Scoring system for body condition (Patience et al., 1995).

Score	Pelvic Bones	Loin	Ribs
1-Emaciated	Very prominent. Deep cavity around tail head.	Vertebrae are prominent and sharp. Very narrow loin. Hollow flank.	Individual ribs are very prominent.
2-Thin	Obvious with slight cover.	Narrow loin. Flank rather hollow. Slight cover on spine, but prominent vertebrae.	Rib cage less apparent but individual ribs easily detected with slight pressure.
3-Ideal	Covered but felt with pressure.	Spine covered and rounded.	Ribs are covered but can be felt with pressure.
4-Fat	Only felt with firm pressure. No cavity around tail.	Difficult to feel vertebrae. Flank filled.	Rib cage not visible and difficult to feel.
5-Obese	Impossible to feel and huge fat deposits (hanging skin/fat).	Thick fat cover, impossible to feel bones. Flank full and rounded.	Thick fat cover, not possible to feel ribs.

Table 2: Definitions of skin integrity scores.**Scratches/lesions****0 - Skin unmarked; no evidence of injury**

1 - < 5 wounds

2 - 5 to 10 wounds; some skin is untouched

3 - >10 wounds; Area covered with scratches/wounds with little or no untouched skin.

RESULTS

Data collection is ongoing and only preliminary results are reported here. Production data for the different space allotments are combined and averages are presented for sows and gilts in the group housing system and dry sow stalls in Tables 3 and 4, respectively.

Table 3. Averages and standard errors of data for parity-one gilts in the group housing system and dry sow stall room at the Arkell Swine Research Station.

	Group		Stall	
	n	Mean \pm SEM	n	Mean \pm SEM
Change in body condition score	44	0.0 \pm 0.06	44	0.4 \pm 0.07
# liveborn piglets	38	9.0 \pm 0.57	41	8.3 \pm 0.44
# stillborn piglets	38	0.3 \pm 0.1	41	0.1 \pm 0.05
# mummies	38	0.9 \pm 0.17	41	0.8 \pm 0.15
Birth weight of liveborn (kg)	37	1.5 \pm 0.05	40	1.5 \pm 0.04

Table 4. Averages and standard errors of data for mixed-parity sows in the group housing system and dry sow stall room at the Arkell Swine Research Station.

	Group		Stall	
	n	Mean \pm SEM	n	Mean \pm SEM
Change in body condition score	134	0.0 \pm 0.05	32	0.0 \pm 0.07
# liveborn piglets	118	10.2 \pm 0.26	28	9.8 \pm 0.60
# stillborn piglets	118	0.3 \pm 0.05	28	0.1 \pm 0.06
# mummies	117	1.2 \pm 0.14	28	1.0 \pm 0.29
Birth weight of liveborn (kg)	115	1.6 \pm 0.02	28	1.5 \pm 0.04

The average body condition scores when entering the group housing facility are 3.5 \pm 0.07 and 3.6 \pm 0.08 for sows and gilts, respectively. Overall, there is little change in body condition for sows in both group housing and stalls and for gilts in group housing. Gilts in stalls tend to

show an increase in body condition by the end of gestation. Data on litter sizes and piglet body weights are similar for the two systems.

Very few animals have died or been removed from the group housing facility (Table 5). It is generally much easier to identify lame or sick animals in loose housing, since changes in their activity patterns are more obvious than for animals in stalls.

Table 5. The numbers/percentages of sows and gilts combined that have been removed from gestation facilities for various causes.

	Group (N=180)		Stall (N=79)	
	n	%	n	%
Open	14	7.8%	5	6.3%
Dead	1	0.6%	1	1.3%
Aborted	3	1.7%	1	1.3%
Culled	2	1.1%	0	-
Lame	2	1.1%	0	-
Euthanized	1	0.6%	0	-

As might be expected with the group sizes held in our system, the most severe scratches and lesions are usually found the day after new groups are mixed. Twenty-five percent of the sows scored in our system have moderate to severe scratches on their shoulders when scored 24 hours after the group is formed. By two weeks post-mixing, most of the wounds have healed and by the end of the first month and for the remainder of gestation, fewer than 5% show evidence of shoulder injuries due to fighting. There was an increase in shoulder lesions in one group housed at 25 ft²/sow at 7 weeks post-mixing. This coincided with the removal of several animals which may have resulted in new outbreaks of fighting to re-establish dominance order in the group.

To date, vulva biting has not been a problem in our facility. Mild superficial scratches have been recorded on 31 (out of 180) animals in groups but similar lesions have been recorded on 3 (out of 79) animals in stalls, suggesting that the cause may be from some aspect of the physical environment rather than other sows. Actual bite marks have been observed on only 2 (out of 180) animals in the group housing system, but even those lesions were classified as minor.

CONCLUSIONS

To date, the productivity of sows and gilts in this group housing system is comparable to that of sows and gilts in the same herd that are held in stalls throughout gestation. The manager and staff of the Arkell Swine Research Station are very satisfied with the performance of the system (Romahn, 2001). They find the sows to be calm, clean and healthy, with reduced labour input.

ACKNOWLEDGEMENTS

We appreciate the financial support of Ontario Pork and OMAF. Very special thanks to Tom Parker, manager of the breeding unit, and all of the Arkell staff.

REFERENCES

- Patience, J. F, P. A. Thacker and C.F.M. de Lange, 1995. Swine nutrition guide. Prairie Swine Centre, University of Saskatchewan, Saskatoon.
- de Koning, R. 1984. Injuries in confined sows. Incidence and relation with behaviour. *Ann. Rech. Vét.* 15 : 205-214.
- Hodgkiss, N.J., J.C. Eddison, P.H.Brooks, and P. Bugg. 1998. Assessment of injuries sustained by pregnant sows housed in groups using electronic feeder. *Vet. Rec.* 143: 604-607.
- Romahn, J. 2001. Sold on group housing. *Ontario Farmer* July 10, p. 1B. 7.