Sow and Litter Performance for Individual Crate and Group Hoop Barn Gestation Housing Systems: A Progress Report II

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Summary and Implications

The effects of swine gestation housing on sow and litter performance were evaluated at the Iowa State University Lauren Christian Swine Research and Demonstration Farm near Atlantic, IA. The gestation systems were 1) individual gestation crates in a mechanically ventilated, partially slatted floor, manure flush confinement building (CRATE); and 2) group pens in deep-bedded, naturally ventilated hoop structures (HOOP). The HOOP sows were fed with individual feed stalls.

The sows were artificially inseminated in a confinement breeding barn with slatted floors and were later moved to their assigned gestation housing treatment. Sows included in the study continued in the same gestation housing their entire time at the farm. All first-litter gilts were gestated in individual gestation crates to minimize sow size differential in the groups. There were 35 sows per group in the HOOP barns. Farrowing occurred every 2 weeks on a year-round basis. All sows were fed 4.5 lb/day and increased to 6 lb/day during the last trimester of gestation. During the winter, HOOP sows were fed 25% more and CRATE sows were fed 5% more.

Reproductive performance was summarized for 493 litters during the period March 2001 to September 2003. This is a progress report of a continuing study. Preliminary trends were a shorter wean-to-breed interval, 0.5 more live pigs born per litter, and 0.5 more pigs weaned/sow/year for HOOP sows compared with CRATE sows. Higher percentages of stillborn and mummied pigs were observed in the HOOP sows compared with the CRATE sows. Slightly lower pre-wean mortality and sow culling rates occurred in the CRATE sows as compared with HOOP sows, with similar sow mortality rates for both groups. The preliminary data suggests that gestating sows can be housed in deep-bedded hoop barns equipped with individual feeding stalls and achieve results comparable to individual crated gestation systems.

Materials and Methods

The effects of swine gestation housing on sow and litter performance were evaluated at the Iowa State University Lauren Christian Swine Research and Demonstration Farm near Atlantic, IA. The gestation systems were 1) individual gestation crates in a mechanically ventilated, partially slatted floor, manure flush confinement building (CRATE); and 2) group pens in deep-bedded, naturally ventilated hoop structures (HOOP). The HOOP sows were fed with individual feed stalls. The sow genotypes were 1/4 Hampshire × 1/2 Yorkshire × 1/4 Landrace. Farrowing occurred every 2 weeks throughout the year.

The breeding protocol was to inject each sow with PG600 at weaning. The sows were moved from the farrowing rooms into group pens in the centralized slatted confinement breeding barn. Four days post-weaning heat detection with a mature boar was performed daily. Sows were artificially inseminated 24 hours after estrus detection. Sows were inseminated a second time 48 hours after estrus detection. Insemination occurred in the presence of a mature boar. At breeding, the sow was moved to an individual stall. Breeding continued for approximately 7 days per group. Semen was delivered within 24 hours of collection and two to three times per week. Sows were moved as a group to their assigned gestation housing by the ninth day post-weaning. Sows were randomly assigned to housing system treatment by farrowing group when the project commenced.

All first parity gilts were gestated in individual crates and randomly assigned to a gestation group after breeding for the second parity. This practice was followed to minimize sow size differential and sow aggression in the group housing system. Sows as a group were moved to farrowing rooms 4 days before expected farrowing. Sows were washed and disinfected before putting them into the individual farrowing crates.

Sow vaccinations were parvo/leptospirosis/erysipelas at weaning, and *E.coli* and *clostridial* scours during lactation. Sows were dewormed twice per year with ivermectin in the feed.

Group size was approximately 35 sows per group. The experiment unit was a group of sows. There were three groups of sows for each housing treatment. Sows were initially assigned to groups on a random basis based on housing availability. Sows remained on the same gestation housing treatment until culling. Culling occurred due to: poor performance, disposition, failure to conceive by third estrous, fitness (condition, lameness, size), and death. Sows were not culled due to age or parity. Culling cause was recorded.

The records summarized were for farrowings that occurred from March 2001 to September 2003. A total of 493 litters are included in the analysis. First parity litters were not included in the analysis because gilts were housed in gestation crates for their first gestation. There were 319

litters from CRATE sows and 174 litters from HOOP sows. The sow and litter data was summarized using PigCHAMP. Only sows that remained in their assigned gestation housing groups were included in this analysis. Sows that switched gestation housing systems were not included in this analysis.

The replacement gilts were purchased as market weight gilts and were generally cycling on arrival. All breeding stock tested PRRS negative. After a 60-day isolation period the gilts were eligible for breeding. Therefore, the gilts were bred no earlier than three estrous cycles after puberty.

The sows were weighed and scanned for 10^{th} rib backfat before farrowing (approximately 110 days of gestation) and at weaning, but these data are not summarized in this report. During gestation, all sows were fed 4.5 lb/day of a corn-soy diet. During the last trimester of gestation, feed allowance was increased to 6 lb/day. During the winter HOOP sows were fed 25% more and CRATE sows were fed 5% more feed. Individual sow feed adjustments occurred and were recorded. Winter was defined as November through March.

At farrowing, the number of pigs born alive, stillborn pigs, and mummified pigs were recorded. The birth weight of the live pigs was also recorded. At weaning, the litter was counted and weighed. Weaning occurred at 17–19 days of age. Pigs gain per day during lactation was calculated. Crossfostering within 24 hours of birth was permitted to equalize litter size and pig weight.

Results and Discussion

The summary of 493 litters during approximately 30 months (March 2001 through September 2003) is shown in Table 1. The data presented are raw means and are preliminary in nature. Note: this is a progress report and not the complete study. The data are not balanced for seasonal effects. Therefore conclusions should be considered preliminary. Overall, sows gestated in HOOP and CRATE gestation systems performed similarly. Apparent differences were observed for several items when HOOP and CRATE sow performance were compared:

- Wean-to-breed interval – slightly less for HOOP sows.
- Pigs born alive/litter – slightly more pigs per litter for HOOP sows.
- Percent mummified pigs – slightly lower percentage for CRATE sows.
- Pigs weaned/mated female/year – slightly more pigs per sow per year from HOOP sows.
- Sow culling rate – HOOP sows had a slightly higher culling rate.

The preliminary data suggests that gestation sows can be successfully housed in deep-bedded hoop barns equipped with individual feeding stalls. These trends only reflect data from sows that remained in their originally assigned housing treatment for the entire study. Many factors including breeding protocol, sow management, sow genetic lines, feeding levels, and farm health status could greatly impact the results from distinct gestation housing systems.

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Table 1. Performance of sows housed in deep-bedded hoop barns or individual confinement crates during gestation. [1]

	HOOP Groups	Individual CRATES
Breeding Performance		
Services, total no.	223	402
Wean-to-breed interval, d	6.9	9.5
Sows bred by 7d, %	93.3	89.7
Farrowing Performance		
Farrowings, no.	174	319
Pigs born alive/litter, no.	10.7	10.2
Stillborn pigs, %	11.8	11.4
Mummies, %	2.2	1.6
Farrowing rate, %	80.6	79.8
Litters/mated sow/year, no.	2.2	2.1
Farrowing interval, d	153	160
Weaning Performance		
Pigs weaned/litter, no.	9.0	9.1
Pre-weaning mortality, %	14.7	12.7
Weaning age, d	19.2	19.3
Pigs/mated female/year, no.	19.6	19.1
Culling rate, %	17.9	14.7
Sow mortality rate, %	6.0	6.4

[1] Period covered is March 2001 through September 2003.