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

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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 housing 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 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 433 litters during the period March 2001 through September 2002. This is a progress report of a continuing study. Preliminary trends were a shorter wean-to-breed interval, fewer still born and mummified pigs (combined), one more live pig born per litter, two more pigs weaned/sow/year, and much lower sow culling and mortality rates for HOOP sows compared to CRATE sows. The preliminary data suggest that gestating sows can be successfully housed in deep-bedded hoop barns equipped with individual feeding stalls.

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 housing 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 x 1/2 Yorkshire x 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 floor 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 initial 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 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 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 experimental 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 through September 2002. A total of 433 litters was in the analysis. First parity litters were not included in the analysis because all gilts were housed in gestation crates for their first gestation. There were 240

litters from CRATE sows and 193 litters from HOOP sows. The sow and litter data was summarized using PigCHAMP. Only sows that remained in their assigned gestation housing group were included in the analysis. Sows that switched gestation housing systems were not included in the 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 10th 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 the gestation feed allowance was increased to 6 lb/day. During the winter, the HOOP sows were fed 25% more feed and the crated sows 5% more feed. Individual sow feed adjustment occurred and were recorded. Winter was defined as November through March.

At farrowing the number of pigs born alive, stillborn pigs, and mummified pigs was recorded. The birth weight of the live pigs also was recorded. At weaning, the litter was counted and weighed. Weaning occurred at 17–19 days of age. Pig 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 433 litters during approximately 19 months (March 2001 through September 2002) 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 the HOOP and CRATE gestation housing systems performed similarly. Apparent differences were observed for several items, when HOOP and CRATE sow performance was compared:

- Wean-to-breed interval - somewhat fewer days for HOOP sows
- Pigs born alive/litter - somewhat more pigs per litter for HOOP sows
- Combined fewer percentage of stillborn and mummified pigs – somewhat fewer from HOOP sows. However, the HOOP sows had apparently more mummies and fewer stillborn pigs than the CRATE sows.
- Pigs weaned/mated female/year - somewhat more pigs per sows per year from the HOOP sows.
- Cull and mortality rate - HOOP sows had a somewhat lower culling rate and mortality rate.

The preliminary data suggest that gestating sows can be successfully housed in deep-bedded hoop barns equipped with individual feeding stalls. The hoop barns may have partial positive attributes related to shorter wean-to-breed intervals and fewer stillborn pigs, perhaps because of increased exercise for the sow. The deep-bedded hoop barn may also provide an environment that encourages sow longevity as reflected by somewhat lower sow culling and mortality rates. However, these trends are merely preliminary indicators. Many factors including breeding protocol, sow management, sow genetic lines, feeding levels and farm health status could greatly impact the results from these distinct gestation housing systems.

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

	HOOP Groups	Individual CRATED
Breeding performance		
Services, total no.	234	294
Wean-to-breed interval, d	7.5	9.6
Sows bred by 7d, %	92.5	88.1
Farrowing performance		
Farrowings, no.	193	240
Pigs born alive/litter, no.	11.6	10.6
Stillborn pigs, %	8.5	10.8
Mummies, %	2.3	1.7
Farrowing rate, %	88.1	85.4
Litters/mated sows/yr, no.	2.3	2.2
Farrowing interval, d	148	158
Weaning performance		
Pigs weaned/litter, no.	9.7	9.3
Pre-weaning mortality, %	14.2	13.5
Weaning age, d	20.3	19.8
Pigs/mated female/yr, no.	22.7	20.7
Culling rate, %	5.5	11.1
Sow mortality rate, %	1.1	5.1

[1]Period covered is March 1, 2001 through September 23, 2002.