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The Effects of Gestation Housing on the Reproductive Performance of Gestating Sows: A Progress Report

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Abstract
There is increasing interest in evaluating group housing for gestating sows. The majority of gestating sows are housed in individual stalls or crates for the majority of the gestation period (100–110 days). Hoop structures are low-cost shelters that can be used for swine. By using feeding stalls and cornstalk bedding, hoops provide a feasible housing system for gestating swine. The objective of this long-term study is to evaluate effects of gestation housing on reproductive performance of sows. Group-housed gestating sows in static groups were compared to sows in individual gestation crates. "Static" refers to a group of sows that is managed as a group without mixing with other groups of sows. The group farrows, is bred, and gestated as an intact group. Replacement gilts are added to the group after farrowing.

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Introduction

There is increasing interest in evaluating group housing for gestating sows. The majority of gestating sows are housed in individual stalls or crates for the majority of the gestation period (100–110 days). Hoop structures are low-cost shelters that can be used for swine. By using feeding stalls and cornstalk bedding, hoops provide a feasible housing system for gestating swine. The objective of this long-term study is to evaluate effects of gestation housing on reproductive performance of sows. Group-housed gestating sows in static groups were compared to sows in individual gestation crates. "Static" refers to a group of sows that is managed as a group without mixing with other groups of sows. The group farrows, is bred, and gestated as an intact group. Replacement gilts are added to the group after farrowing.

Materials and Methods

The effects of swine gestation housing on the reproductive performance of sows were evaluated at the Iowa State University Lauren Christian Swine Research and Demonstration Farm near Atlantic, Iowa. Gestation housing systems used were: (1) individual gestation crates in a mechanically ventilated, partially slatted floor, manure flush building (CRATE); (2) group pens in a naturally ventilated, curtain-sided, partially slatted floor, modified-open front building with no bedding and a deep manure pit (MOF); and (3) group pens in deep-bedded, naturally ventilated hoop structures (HOOP).

Group size was approximately 30–37 sows/group. The groups were housed together and not commingled with other sow groups. The groups were farrowed, weaned, bred, and gestated as a batch. Sows were bred using artificial insemination in a centralized slotted floor confinement breeding barn equipped with individual crates. They were moved in groups to gestation housing within seven days of breeding. Each was assigned to one of the three gestating housing systems and returned to the same gestation housing system for all subsequent parities. The sows were 1/4 Hampshire, 1/4 Landrace, and 1/2 Yorkshire bred to terminal Duroc boars. The records analyzed are for 301 litters born July through October 2001. These were the first litters on this study.

Farrowing occurred on a biweekly schedule, with sows in a range of parities. At 110 days of gestation, sows were moved to farrowing crates. Number and weight of pigs was recorded at farrowing and at weaning. Crossfostering was used to equalize litter size and pig weight. It occurred within 24 hours of birth and only across litters of the same housing system Weaning occurred at 17–21 days of age.

Sows were fed *ad libitum* during lactation and 4.5 lbs/day of a corn-soy diet during gestation. During winter (November–March), the HOOP sows were fed 25% more to offset increased energy needs due to cold conditions. Also, the MOF sows were fed 5% more during winter to offset their needs. The MOF curtain-sided facility had supplemental heat in the floor. All diets were based on the ISU Life Cycle Swine Nutrition (Pm-486). Sow culling was based on poor performance, disposition, failure to breed, fitness (condition, lameness, size), and death.

Results and Discussion

Results are shown in Table 1. There were three groups of sows assigned to each gestation housing system. The rebreeding rate was the highest (>40%) and farrowing rate the lowest (<60%) for the sows group housed in the MOF. The group-housed HOOP sows had rebreeding rates and farrowing rates that were much improved compared with the MOF sows. The rebreeding rate for the HOOP sows was 19% and the farrowing rate 81%. However, the CRATE sows had the lowest rebreeding rate (11%) and the highest farrowing rate (90%). The average litter size at birth and weaning was excellent for all systems, with no major differences or trends.

These results are preliminary and do not represent the entire project. However, the very low farrowing rate of the group-housed MOF sows is difficult to explain. No major pathogens were known to be in the herd. Sow nutrition was adequate. Perhaps there is a transition period for the sows before the groups stabilize, although it is difficult to create stable, static groups when farrowing rate is low. There may have been management or reproductive techniques more advantageous to the group-housed sows. Moving the sows 7 days or less post-breeding into group housing, may have reduced conception or farrowing rate. During the period of embryo implantation, the group-housed sows had to establish their group hierarchy and adjust to an environment with less modification. Although the CRATE sows were moved at the same interval, they were moved to individual crates in a building with heat, fans, and drip cooling. Moving the sows after implantation (approximately 21–28 days post-breeding) may help this situation, although breeding barn capacity would need to be greatly expanded. Also, the group-housed sows may have stress in adapting to widely varying housing systems. Additionally, group-housed sows may need more space than was provided to accommodate sow dominance, particularly in the MOF.

Based on this preliminary data, the HOOP group-housed sows had acceptable reproductive performance. Perhaps the bedding and additional space in the hoops allowed for less stress among the group-housed sows. Additional research will clarify these early trends.

Table 1. Average farrowing rate, rebreeding rate, pigs born/litter and pigs weaned/litter for gestating sows housed in crated and group-housed systems, 2001.

Housing system	CRATE	MOF	HOOP
Sow groups	3	3	3
Sows, assigned	107	101	93
Sows, died	1	2	4
Sows, rebred	11	37	16
Sows, nonbreeders	5	9	6
Sows, farrowed	91	53	67
Rebreeding rate, %[1]	10.9	41.1	19.3
Pigs born live, no.	1,012	610	695
Pigs weaned, no.	856	474	606
Farrowing rate, %[2]	90.1	58.9	80.7
Pigs born/litter	11.12	11.51	10.37
Pigs weaned/litter	9.41	8.94	9.04

[1] Rebreeding rate = sows rebred/[sows assigned–(sows, died + sows, nonbreeders)].
[2] Farrowing rate = sows farrowed/[sows bred–(sows, died + sows, nonbreeders)]
CRATE = individual gestation crate.
MOF = modified open-front partial slotted floor.
HOOP = deep-bedded hoop structure.