Sow and Litter Performance for Two Genotypes in Crated and Group Gestation Systems

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Methods

The effects of swine gestation housing on sow and litter performance of two genotypes 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, manure flush confinement building with a partially slatted floor (CRATE); 2) group pens in a naturally ventilated, curtain-sided, modified-open front building with a partially slatted floor, no bedding and a deep manure pit (MOF); and 3) group pens in deep-bedded, naturally ventilated hoop structures (HOOP). The group-housed gilts were individually fed with either individual feed stalls (FS) or computerized electronic feeders (EF). Sows fed with the electronic feeders were given an initial training period the week after breeding during which time they learned to use the feeders. The two sow genotypes were Yorkshire x Landrace (WHITE sows) and 1/4 Hampshire x 1/2 Yorkshire x 1/4 Landrace (COLOR sows). The Yorkshire and Landrace breeding was similar in both genotypes. Duroc terminal boars were mated to all sows. Farrowing occurred weekly throughout the year. Cross fostering occurred across all sows.

Sows were naturally mated in a centralized, slatted floor confinement breeding barn. Three to seven days after breeding, the sows were randomly assigned to one of the gestation systems. The sows returned to the same assigned gestation housing system after breeding for the second parity. The groups consisted of 40 to 60 sows. Sows were added weekly to the groups from the breeding barn, and were removed weekly from the groups for transfer to the farrowing rooms. Three to five sows were added or removed each week. Thus, the group housed sows were in dynamic groups, i.e., the composition of the group changed weekly.

The records analyzed were for farrowings that occurred from April 1998 through December 1998. A total of 585 litters was included in the analysis. This included first parity litters (n=409) and second parity litters (n=176). There were 322 litters from COLOR sows and 263 litters from WHITE sows.

Results and Discussion

Note: Because of the short time period (April to December), the variability of many of the parameters measured and the few number of parities in this data set, conclusions drawn from these data should be limited and regarded as preliminary. In addition, the second parity was cut short by the disease outbreak. After repopulation a similar experiment will be initiated without the challenges of new construction, multiple sow breed lines, and management of a new farm.

Genotype

The WHITE sows had more pigs born alive (7.5%), more stillbirths, heavier pigs at birth (9.5%), more weaned pigs (8.2%), and heavier litter weaning weights (5.7%) at 18.5 days of age than the COLOR sows. If the number of live pigs and stillborn pigs are combined, the WHITE sows gave birth to more than an additional pig per litter than the COLOR sows. Also, the pigs from WHITE sows grew slightly faster (4.4%) from birth to weaning. The WHITE sows were heavier and had more backfat before farrowing, and were heavier at weaning. There was no difference in backfat at weaning. The WHITE sows consumed more feed per day during lactation.

Parity and genotype
As expected, sow performance in the second parity was improved for both genotypes over the first parity for most items measured.

Genotype and housing systems
The analysis of sow genotype by gestation housing system showed that there was no difference in pigs born live per litter, stillbirths, mummified pigs, pig birth weight, pig gain, or weaning weight across housing systems. The number of pigs weaned was greater for the COLOR sows in crates than the COLOR sows housed in groups with an electronic feeder (MOF/EF or HOOP/EF) (P<.05). For the WHITE sows housed in crates, the number of pigs born live per litter and number of pigs weaned was greater than for the WHITE group housed sows (P<.05). The number of stillborn pigs for the WHITE sows housed in a modified open front unit with electronic feeder and a hoop unit with feeding stalls was greater than the other housing systems, except for the modified open-front with electronic feeder (P<.05). For the WHITE sows there were no differences for mummified pigs, pig birth weight, weaning weight, or pig gain.

The COLOR sows housed in crates were heavier and had more backfat prefarrowing than the COLOR sows in other housing systems (P<.05). The COLOR crated sows were also heavier (P<.05) and had numerically more backfat at weaning. The WHITE sows in hoops with electronic feeders weighed less than the other sows (P<.05). There were no other differences in WHITE sow weights or backfat by housing type.

In examining the performance of all the sows (COLOR and WHITE) for the five housing types, the WHITE sows gestated in crates gave birth to more pigs and weaned more pigs per litter than any other housing group (P<.05). The number of stillborn pigs was highest for the WHITE sows from the modified open-front with an electronic feeder and from the hoop with feeding stalls, although the later did not differ from the modified open-front with feeding stalls. The WHITE sows had numerically heavier pigs at birth and at weaning.

In general, the sows in crates were heavier at prefarrowing and at weaning than the group-housed sows. The WHITE sows had numerically more backfat than the COLOR sows at both prefarrowing and at weaning. In aggregate there is some evidence that the group housed sows, particularly those fed with the electronic feeders, may not have received adequate feed. This may be due to the stress of the dynamic sow groups, the colder group housing systems or inexperience in managing the electronic feeders.

Conclusions

Although this was a shortened trial, and the sows were young (first and second parity), the results suggest that 1) the WHITE genotype sows demonstrated superior litter traits than the COLOR sows; 2) the dynamic groups and more rigorous environment of the hoop and modified open-front facilities during gestation reduced the litter performance of the WHITE sows; 3) the group-housed sows in cold housing probably required additional feed to match the weight of the crated sows; 4) mixing the sows in dynamic groups likely reduced litter performance; 5) the COLOR sows may have adapted better to the group housing; 6) there was no apparent advantage in litter performance using the electronic feeders compared with feeding stalls; and 7) the bedded hoop structures were no different than the modified open-front partially slatted floor confinement as group housing for gestating sows when using litter and sow performance as the comparison.

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