Effects on Production and Health of Two Types of Housing for Pregnant Gilts

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Introduction

There is increasing public concern about the welfare implications of confinement housing systems for farm animals. Gestation stalls are a common method of housing pregnant swine in the USA. Single housing of pregnant sows in stalls and on tethers has been criticized because these systems severely restrict females' freedom of movement. However, single housing allows easy individual control of feed intake and minimizes aggression, factors which may compromise the welfare of sows housed in groups. Welfare concerns have led to the recent decision to phase out gestation stalls in the European Union. Few previous studies have directly compared stall and group housing systems under controlled conditions and using a multidisciplinary approach.

A study was designed to compare the effects on production and health of housing gilts throughout one pregnancy in either gestation stalls or groups of four with individual feeding stalls.

Materials and Methods

Forty-eight Yorkshire × Landrace gilts were allocated to either an individual stall (7 ft 3 in × 2 ft) or group of four (12 ft 11 in × 8 ft with four individual feeding stalls) by d 7 post-breeding. Floors were fully slatted concrete and no bedding was provided. Females were limit fed once per day. Housing systems were contained within a single room and all conditions, except for stall or group housing method, were identical.

Gilts were weighed at entry to gestation (approx. 7 d after breeding) and again at d 35, 63 and 91 after breeding. On each occasion that they were weighed, gilts' backfat was measured at the 10^{th} rib site on the right and left sides of the body, and a mean of these two measurements used.

Skin health was evaluated every two weeks throughout gestation using a scoring system adapted from Arey (1999) and Boyle et al. (2000). Six regions of the head and body and five areas of the feet and legs (Table 1) were inspected, and given a skin health score between 0 and 5 (Table 2).

As females walked down the corridor from their gestation accommodation during transfer to farrowing, lameness was scored by a single observer, using a 6-point gait scoring system (Main et al., 2000). Possible gait scores ranged from 0 (indicating even strides and normal gait) to 5 (indicating that the pig was unable to stand or move unaided).

Body weight and backfat data were analyzed using a repeated measures analysis of variance (Proc GLM, SAS Institute Inc., 1990). Skin health scores were compared using a Wilcoxon non-parametric one-way analysis of variance (Proc NPAR1WAY, SAS Institute Inc., 1990). Lameness scores were analyzed using a chi-square 2 (group; stall) × 3 (lameness score: 0; 1; 2/3) contingency table.

Results and Discussion

There was no overall effect of housing on the amount of weight that gilts gained during gestation, nor were there any differences in gilt weight on any of the four measurement days (Figure 1). There were no differences in backfat measurement between gilts housed in stalls and those housed in groups on any of the four measurement days (Figure 2).

There was no significant difference in skin health between gilts allocated to groups and stalls at the time of transfer to gestation. From d 21 after breeding (2 wk after entry to gestation housing) to d 91 after breeding, body skin health was consistently poorer in group-housed than stall-housed gilts. Figure 3 shows differences between skin health scores for the six body regions on d 91. At d 91 the feet and legs of gilts housed in groups were also in significantly poorer condition than those of stall-housed animals (Figure 4).

The majority of gilts (63%; 10 stall, 16 group) walked normally without limping or showing any sign of lameness, and scored 0. Ten gilts (24%; 4 stall, 6 group) scored 1 (slight abnormality of stride length), four (10%; 4 group) scored 2 (uneven posture and obvious lameness) and one (3%; 1 group) scored 3 (shortened stride, lameness and unwillingness to put weight on the affected limb). No scores of 4 or 5 were recorded. The mean score for group-housed gilts was 0.64, vs. 0.29 for stall-housed gilts. This difference was not statistically significant ($p > .10$).

These results indicate no difference in production between gilts housed during their first pregnancy in stalls or small groups. Group-housed females had more scratches, cuts and wounds on their head, face and body than did those housed in stalls. Although some of these lesions were a result of aggression between group members, injuries may also have been caused by individuals being stepped on, or contact with sharp pen fittings. These accidental wounds may also have contributed to the higher lesion scores for group-housed females' feet and legs. While higher feet and leg lesion scores did translate into higher average lameness scores for grouped females, this difference was not significant.

Applications

Group housing systems for pregnant swine are likely to become increasingly prominent in the USA in the near future. It is important to scientifically evaluate the effects of different methods of housing pregnant sows in order to help develop optimal management systems. This controlled comparison of stall and small group effects, using a multidisciplinary approach (production, health, behavior and immunological measures) will enable a comprehensive evaluation of well-being. We are currently in the process of analyzing behavioral data for this study, and some immunological findings follow (see Sorrells et al., Swine Research Report 2001).

It is important to note that our results apply only to the particular housing systems evaluated. Stalls were generously sized, particularly for gilts, and findings may have been different had smaller stalls or older sows been used. Larger groups, those using bedding and/or a different feeding method may affect production and well-being differently. We examined gilts during a single pregnancy, and housing method effects may differ, or may be intensified, in females who occupy a system for several parities.

References

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Table 1. Head and body regions and feet and legs areas evaluated during skin health scoring

Head and Body Regions	Feet and Legs Areas
1. Head, ears and face	1. Elbows
2. Shoulders and neck	2. Carpal joints
3. Mid-body	3. Fetlocks
4. Udder	4. Accessory digits
5. Rump	5. Tarsa-metatarsal joints
6. Tail	

Table 2. Six-point scoring system used to evaluate skin health for head and body regions and feet and legs areas

Skin Health Scores (Head and Body)	Skin Health Scores (Feet and Legs)
0. Normal (no blemish)	0. Normal (no blemish)
1. Some reddening or callus	1. Alopecia or callus
2. Less than 10 scratches	2. Redness
3. Less than 5 cuts or small wound	3. Wound or swelling
4. 10 or more scratches	4. Severe wound
5. 5 or more cuts or large wound	5. Severe wound and severe swelling

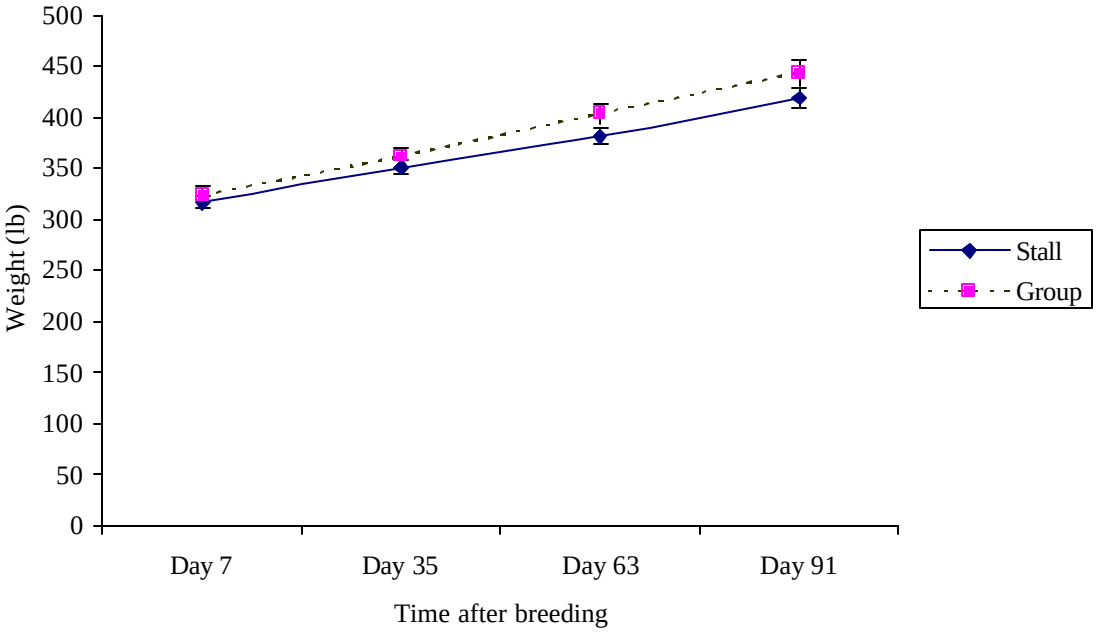

Figure 1. Weights on d 7 to d 91 after breeding for pregnant gilts housed in stalls and groups

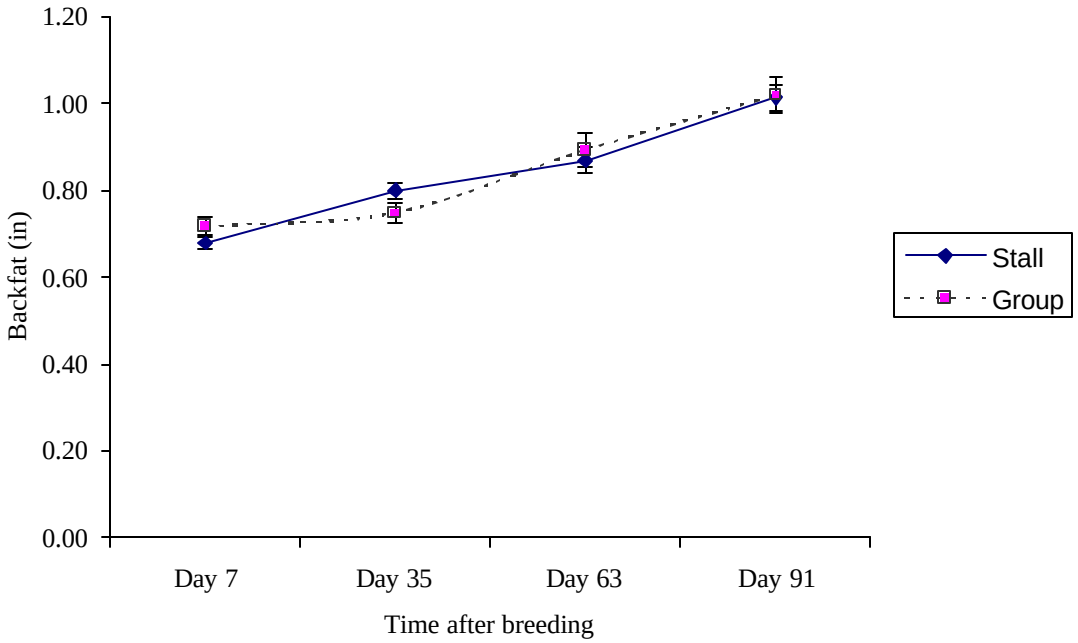

Figure 2. Backfat measurements on d 7 to d 91 after breeding for pregnant gilts housed in stalls and groups

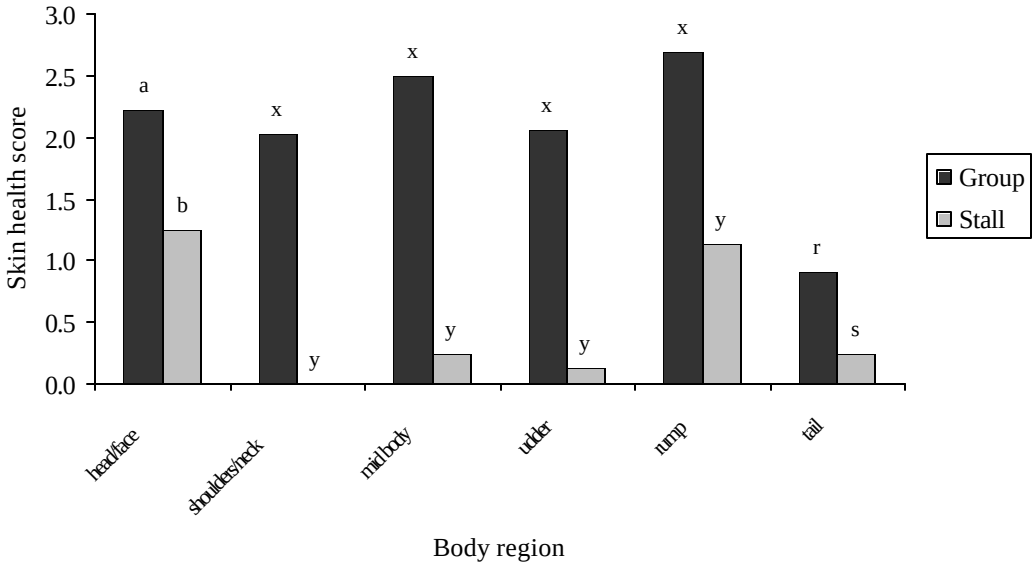

Figure 3. Skin health scores (head and body) for group and stall-housed gilts on d 91 after breeding

[a, b] Means with different letters (same region) differ at P < .05
[r, s] Means with different letters (same region) differ at P < .01
[x, y] Means with different letters (same region) differ at P < .001

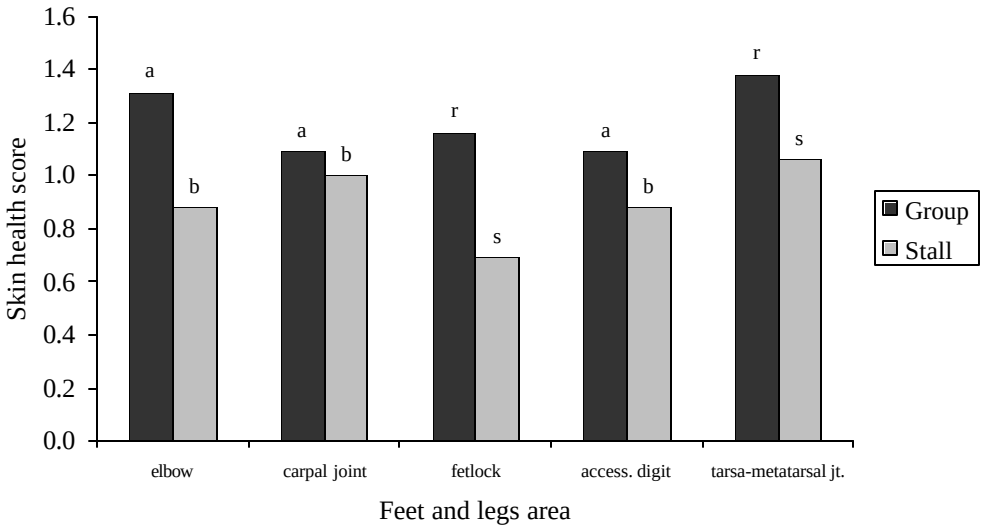

Figure 4. Skin health scores (feet and legs) for group and stall-housed gilts on d 91 after breeding

[a, b] Means with different letters (same area) differ at P < .05
[r, s] Means with different letters (same area) differ at P < .01