The Effect of Selection for Residual Feed Intake on Lesion Scores in Yorkshire Gilts

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Summary and Implications

The objectives of this study were to determine the effect of selection for reduced residual feed intake (RFI) on lesion scores in gilts in their home pen. A total of 192 gilts were used; 96 were from a line that had been selected for low residual feed intake over 5 generations (LRFI) and 96 from a randomly bred control line (CRFI). Gilts were housed in 12 pens (16 gilts/pen; 0.82 m²/gilt) containing 8 gilts from each line in a conventional grow-finish unit. Lesion scores were collected the day after placement and every 4 weeks for 3 subsequent periods. The gilt's body was divided into 4 regions, with each region receiving a score of 0 (0 lesions) to 3 (5+ lesions). All analyses were done using Proc Mixed of SAS. The data were analyzed separately for the day after placement and the subsequent three rounds. Lesion scores for each region of the body were analyzed as repeated measures. Gilts from the LRFI line had lower ($P < 0.045$) lesion scores on the day after placement. However, over subsequent rounds there were no ($P > 0.05$) differences between the genetic lines. In conclusion, gilts from the line selected for low RFI had lower lesions scores on the day after placement into the grow-finish environment and this may be a useful tool to use in a selection program for more efficient gilts.

Introduction

Approximately 34% of differences in feed intake between pigs are not related to growth and backfat. Although past selection for lean growth has substantially increased feed efficiency in pigs, further increases are limited by differences in feed intake that are unrelated to growth and backfat. These differences in feed intake independent of growth and backfat have been called residual feed intake (RFI). Factors that can contribute to RFI include activity, digestion, metabolism (anabolism and catabolism) and thermoregulation. One factor that may affect differences in RFI is behavior of the individual animal. The objectives of this study were to determine the effect of selection for reduced residual feed intake (RFI) on lesion scores of gilts in their home pen.

Materials and Methods

Experimental design

The protocol for this experiment was approved by the Iowa State University Institutional Animal Care and Use Committee. The experiment was conducted from April 15 to August 14, 2008. A total of 192 gilts were used. Half of the gilts were from a line that had been selectively bred for low residual feed intake over 5 generations (LRFI) and the other half from a randomly bred control line (CRFI). Gilts on average started the trial weighing 40 kg. At the end of the trial, average gilt weight was 74 kg. The experimental design for this study was a randomized complete block design, with pen as block and individual pig as the experimental unit.

Housing and feeding

All gilts were housed in a conventional confinement unit located at the Lauren Christian Swine Research Center at the Iowa State University Bilsland Memorial Farm, near Madrid, Iowa. Gilts were housed in 1 room that contained 12 pens, 16 gilts/pen, providing 0.82m²/gilt. Each pen measured 5.6 m length x 2.3 m width. Each pen contained a 2 nipple-type waterer (Edstrom, Waterford, WI) providing ad libitum access. A Feed Intake Recording Equipment feeder (FIRE®, Osborne Industries, Inc., Osborne, KS) provided ad libitum access to a standard finishing diet that was formulated to meet or exceed the requirements for growing pigs.

Lesion scoring

The day after placement, lesion scores were collected by 2-trained technicians. Scoring was done in the home pen with one technician scoring all gilts in a pen and the other technician recording the scores. Lesions were defined per the PQA Plus definition of skin lesions (NPB, 2007), as "…*breaks that completely penetrate the skin, such as bites or other lesions that penetrate through the skin*." A lesion was included in the count if the scab was tightly adhered to it and covered it. If the scab was ready to fall off it was not included. Gilts were scored for all lesions present on the visible portions when standing (e.g., lesions on the underbelly or inside the ears, which are not normally visible on standing gilts, would not have been included). The gilt's body was divided into 4 regions. **Region 1** was the head, jowl and neck, including the snout and ears. **Region 2** was the withers, shoulders and front legs. **Region 3** consisted of the trunk of the pig, which included the back, chest, loin, abdomen and flank. **Region 4** was the rump, thigh and back legs (Figure 1).

Figure 1. Photograph to demonstrate the regions on the gilt.
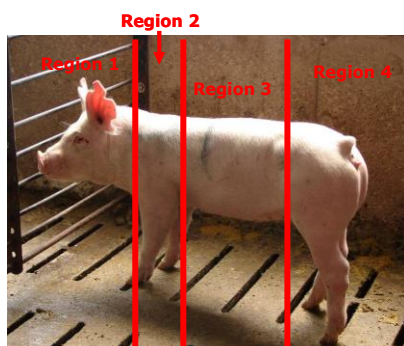
Each region received a score of 0 to 3. A 0 indicated there were no lesions present in that region of the gilt. A score of 1 indicated there were 1 or 2 lesions in that region. A score of 2 indicated 3 or 4 lesions present, and a score of 3 indicated that there were 5 or more lesions present (Figures 3a and b).

Figure 3a. Gilt that would score a 0.

Figure 3a. Gilt that would score a 3.

Statistical Analysis

Analyses were done using Proc Mixed of SAS. The data were analyzed separately for the day of placement and the subsequent for three rounds. Lesion scores for each region of the body were analyzed as repeated measures. The experimental design for this study was a randomized complete block design, with pen as block and individual pig as the experimental unit.

Results and Discussion

On the day after placement, across all regions, the LRFI gilts had lower (2.03 ± 0.12) lesion scores than the CRFI (2.27 ± 0.12) gilts ($P = 0.045$). By examining the line by region interaction ($P < 0.05$), the LRFI gilts had lower scores for all regions than the CRFI gilts, although this difference was not significant ($P = 0.85$) for region 4. There was no significant difference ($P = 0.66$) in lesion scores between LRFI and CRFI for subsequent rounds (1.84 ± 0.22 vs. 1.80 ± 0.22 lesion score). In conclusion, gilts from the line selected for low RFI had lower lesions scores on the day of placement into the grow-finish environment and this may be a useful tool to use in a selection program for more efficient gilts.