

Feeding Behavior of Yorkshire Pigs Selected for Residual Feed Intake

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Summary and Implications

Feeding behavior traits were evaluated in Yorkshire gilts from the fourth generation of the ISU residual feed intake (RFI) selection experiment. Gilts were fed using FIRE feeders. Compared to the randomly selected control line, pigs from the line selected for lower RFI, had lower residual feed intake, ate less per day, spent less time eating per day, and ate faster per visit, regardless of whether analysis was over the whole test period, the first half of test period, or the second half of test period. In conclusion, selection for lower RFI has significantly changed feeding behavior, which could be part of the reason why they are more efficient.

Introduction

Feed efficiency is becoming increasingly important with the rising cost of feed. Residual feed intake (RFI) is a measure of feed efficiency that is defined as the difference between observed feed intake and feed intake predicted from average requirements for growth and maintenance. With the development of new technology, feeding behavior has become easier to measure on an individual basis. By evaluating feeding behavior, the biology behind decreased RFI may be better understood.

Materials and Methods

Using purebred Yorkshire pigs, a selection line for RFI and a randomly selected control line were started in 2001. To measure feeding behavior, pigs were housed in 12 pens of 16 pigs ($n=192$) with a single FIRE feeder (Osborne Industries Inc., Osborne, KS). A FIRE feeder is an electronic feeder that records an individual pig's feed intake and feeding time through a transponder in the pig's ear. In early generations, only pigs in the select line were evaluated for feed intake. For the first parity, boars are placed on the feeders. For the second parity, gilts are placed on the feeders. However, starting in the second parity of the fourth generation, both select and control pigs were evaluated for feed intake, with pigs from the two lines mixed in pens. Data from the FIRE feeders were edited using methods developed by Casey.

For this analysis, data from the second parity of the fourth generation were used. Six behavior traits were measured over three time periods: average daily feed intake

(DFI), average feed intake per visit (FIV), average feeding rate per visit (FRV), average occupation time per day (OTD), average occupation time per visit (OTV), and average number of visits per day (NVD). Time periods were the whole test period, from approximately 3 to 8 months of age, over the first half of the test period (1), and over the second half of the test period (2). Behavior traits were analyzed using the PROC MIXED procedure of SAS (SAS Institute Inc., Cary, NC). Fixed effects included in the model were age the pig was put on test, line, genotype for a marker in the CALCR gene, line*genotype, and feeder. Random effects included were sire, litter, pen, and group. DFI was used as a covariate for other traits to determine whether the difference in behavior was an actual difference in feeding behavior or just a result in differences in DFI.

Results and Discussion

Significant differences in feeding behavior were found between lines. Daily feed intake was found to be significantly different between lines ($P = 0.006, 0.048$ and 0.007 for DFI, DFI1, and DFI2, respectively) with select pigs eating less per day than control pigs. However, no significant differences were found between lines for feed intake per visit (FIV, FIV1, and FIV2). Occupation time per day was found to be significantly different between lines ($P = 0.034, 0.027$ and 0.045 for OTD, OTD1, and OTD2, respectively), with select pigs spending approximately 10 minutes per day less in the feeders than control pigs, even after correcting for differences in DFI. Occupation time per visit was, however not significantly different between lines (OTV, OTV1, and OTV2). OTV1, however, tended to differ between lines ($P = 0.077$). Number of visits per line (NVD, NVD1, and NVD2) did not differ between lines. Feeding rate per visit did differ between lines ($P = 0.045, 0.024$, and 0.052 for FRV, FRV1, and FRV2, respectively), with select pigs eating faster than control pigs. The difference in DFI between lines, demonstrates that selection has reduced feed intake in the select line. A correlated response to selection for RFI was a decreased time spent per day in the feeder and an increased feeding rate per visit, even after adjusting for differences in DFI. Future research will evaluate the relationship between feeding behavior and RFI.

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