Approachability to a Human in Gilts Divergently Selected for Feed Efficiency

A.S. Leaflet R3016

Johanna Sholar, Undergraduate Research Assistant;
Jessica Colpoys, Graduate Research Assistant;
Nicholas Gabler, Associate Professor;
Aileen Keating, Assistant Professor,
Department of Animal Science, Iowa State University;
Suzanne Millman, Associate Professor,
Department of Veterinary Diagnostics and Production
Animal Medicine, Iowa State University College of
Veterinary Medicine;
Janice Siegford, Assistant Professor,
Department of Animal Science, Michigan State University;
Anna Johnson, Associate Professor, Department of Animal
Science, Iowa State University

Summary and Implications

The objective of this study was to evaluate approachability of gilts divergently selected for residual feed intake (RFI) to a novel human. Twenty low-RFI and 19 high-RFI gilts were tested using a human approach test. Testing occurred over two consecutive weeks between 1300 and 1900 hours. Gilts were tested individually within a 4.9 x 2.4 m test arena. Throughout the test, latency to first enter, duration of time spent, and frequency of entrances within 1 m and 0.5 m of the human were recorded. These results suggest that divergent selection for RFI did not alter gilt approach behavior to a novel human.

Introduction

Residual feed intake (RFI) is one way to select pigs for efficiency in which an animal utilizes feed for growth. Low-RFI (more feed efficient) pigs consume less feed for equal weight gain compared to their less efficient, high-RFI (less feed efficient) counterparts. Factors that are known to contribute to divergence in feed efficiency and RFI include digestion, metabolism, and thermoregulation. However, little is known about how approach behavior contributes to RFI and feed efficiency. Human approach behavior can be measured to evaluate how the animal copes with human interaction. Therefore, the objective of this study was to evaluate approachability of gilts selected for RFI during a human approach test.

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 between February and March, 2013. A total of 39 Yorkshire gilts with a mean (±SD) age of 101 (±9) days, divergently selected for RFI (n =20 low-RFI gilts and 19 high-RFI gilts) were tested.

Animals and housing: This work was conducted at the Lauren Christian Swine Research Center at the Iowa State University Bilsland Memorial Farm, near Madrid, Iowa. Gilts were housed in mixed line and sex groups (15 to 16 pigs/pen) and each pen contained one Osborne single spaced electronic feeder (FIRE®, Osborne Industries, Inc., Osborne, KS) positioned at the front of the pen.

Human approach test: Testing occurred over two consecutive weeks between 1300 and 1900 hours. The pigs were tested individually within a 4.9 x 2.4 m test arena. Arena sides were lined with black corrugated plastic at a height of 1.2 m. The arena floor was divided by two lines, one located 1 m from the human and the other located 0.5 m from the human (Figure 1).
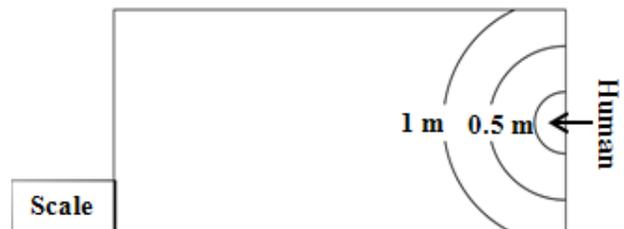

F**igure 1. Arena where pigs received the human approach test.**

During testing, gilts were individually moved from their home pen to the test arena, which was located in a different room within the same building. Each gilt was weighed and remained in the weigh scale for one minute. The weigh scale door was then opened into the back corner of the test arena and each pig was assessed for 10 minutes.

Measures: Three color cameras (Panasonic, Model WV-CP-484, Matsushita Co. LTD., Kadoma, Japan) were placed above the test arena for video collection. Video was collected onto a computer using Handy AVI (HandyAVI version 4.3 D, Anderson's AZcendant Software, Tempe, AZ, USA) at 10 frames/sec.
Continuous observation of video was done by one observer using Observer software (The Observer XT version 10.5, Noldus Information Technology, Wageningen, Netherlands). Parameters analyzed were latency, defined as the total time to first enter within 1 m or 0.5 m of the human, duration, defined as the percent of time spent within 1 m or 0.5 m of the human, and frequency, defined as the total number of 1 m and 0.5 m entrances (Table 1).

Table 1. Definitions for collected behaviors

Measure	Definition
1 m	The base of both the gilt's ears were within 1 m but > 0.5 m from the human.
0.5 m	The base of both the gilt's ears were within 0.5 m of the human.

Data analysis: Data were analyzed using the Glimmix procedure of SAS (SAS Institute Inc., Cary, NC, USA). The model included the fixed effects of genetic line and test week, random effect of pen, and covariate of age on the day of testing. The significance level was fixed at $P \leq 0.05$.

Results and Discussion

During the human approach test, there were no observed differences between low- and high-RFI gilts in latency to approach within 1 m or 0.5 m of the human ($P \geq 0.38$). Genetic lines did not differ in duration of time spent within 1 m and 0.5 m of the human ($P \geq 0.49$). Furthermore, no differences were observed in total number of 1 m or 0.5 m entrances ($P \geq 0.59$; Table 2). These results suggest that divergent selection for RFI did not alter gilt approach behavior to a novel human.

Table 2. Latency to first enter (s), duration of time spent within (%), and frequency (n) of 1 m and 0.5 m entrances (least square means ± SE) during the human approach test.

Measure	Genetic line		*P*-value
	Low-RFI	**High-RFI**	
Latency (s)			
1 m	52.71 ± 13.45	64.47 ± 16.68	0.47
0.5 m	63.49 ± 14.33	80.75 ± 18.53	0.38
Duration (%)			
1 m	8.03 ± 0.81	8.85 ± 0.86	0.49
0.5 m	10.72 ± 1.32	11.86 ± 1.41	0.55
Frequency (n)			
1 m	17.80 ± 0.94	18.27 ± 0.98	0.74
0.5 m	8.45 ± 0.65	8.96 ± 0.69	0.59