

How Location of Feed Affects the Rate of Feeding in Multi-parity Sows

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Analia Roca, graduate research assistant;
Whitney Holt, undergraduate research assistant;
Anna K. Johnson, assistant professor;
Kenneth J. Stalder, professor,
Department of Animal Science;
Lori L. Layman, research associate II;
Locke A. Karriker, assistant professor,
Veterinary Diagnostic Animal Production

Summary and Implications

Sows are often selected by their body size and gestation groups are formed from this initial selection. However, size of sow and rate of feeding speed have not been determined, and instead of body size as the selection criteria, would rate of feeding be a better determinant for sows being grouped? Therefore, the objective of this study was to (1) estimate the range of speeds that a sow consumes a pre determined ration, (2) determine how sow parity affects the rate of feeding and (3) ascertain if feeding rate differs when feed is presented on the floor versus a raised ledge. To avoid aggression, 11 clinically normal, mixed-parity, crossbred sows were purchased from a commercial producer in Iowa and housed in individual pens at Iowa State University. Sows were all feed by hand and the ration was formulated to meet the NRC (1998) requirements for that sow at her stage of production. Data was collected on the afternoon feeding (1600 h) and each sow received 0.90 kg (2 lb). **Treatment One;** Floor; defined as food being placed centrally 1 m in distance on the rubber mat from the back of the home pen. **Treatment Two;** Ledge; the ledge was defined as a raised concrete step. Scoring of feeding rate was conducted by live observation (one person to one sow). Data were analyzed using the PROC MIXED procedure of SAS and a repeated measure statement of date nested within sow was used. A $P < 0.05$ was considered significant and PDIFF was used to separate the means. The feeding rate (sec) range for sows within parity will be presented descriptively. No differences were found for parity ($P = 0.59$) of sow, although parity one sows ate quicker (14 mins) compared to parities two (20 mins) and three (19 mins). There was a difference ($P = 0.02$) for rate of feeding when sows were presented with feed on the floor of their home pen or on the raised feeder. In conclusion there was no difference between rates of feeding by parity when sows were housed individually in a home pen. However, when feed was presented on the floor the sows ate more quickly compared to a raised ledge.

Introduction

Fraser and Broom (1990) noted that “Feeding behavior is strongly influenced by reinforcement, both positive and negative, from food palatability and by the environmental and social associations of feeding.” Gilts and multi-parity sows are fed to maintain their body weight (without the extremes of too thin or too fat). Sows are often selected by their body size and gestation groups are formed from this initial selection. However, size of sow and rate of feeding have not been determined, and would rate of feeding be a better determinant for sows being grouped? Therefore, the objective of this study was to (1) estimate the range of speeds that a sow consumes a pre determined ration, (2) determine how sow parity affects the rate of feeding and (3) ascertain if feeding rate differs when feed is presented on the floor versus a raised ledge.

Materials and Methods

Animals and housing: This project was approved by the IACUC. To avoid aggression, 11 clinically normal, mixed-parity (parity one; $n = 3$; parity two; $n = 3$; parity three; $n = 3$; parity four; $n = 2$), crossbred sows were purchased from a commercial producer in Iowa and housed in individual pens at Iowa State University. Each pen measured 3.72 m length x 1.36 m width x 1.24 m height. A rubber mat (2.36 m length x 2 cm height x 1.36 m width) was provided for sow comfort. Sows had *ad libitum* access to water via one nipple waterer that was positioned over a grate. Metal fences (1.18 m height x 76 cm width) were affixed at the end of each home pen and lights were on a 12:12 light dark cycle (light hours were between 0600 and 1800). The research was conducted in June 2009.

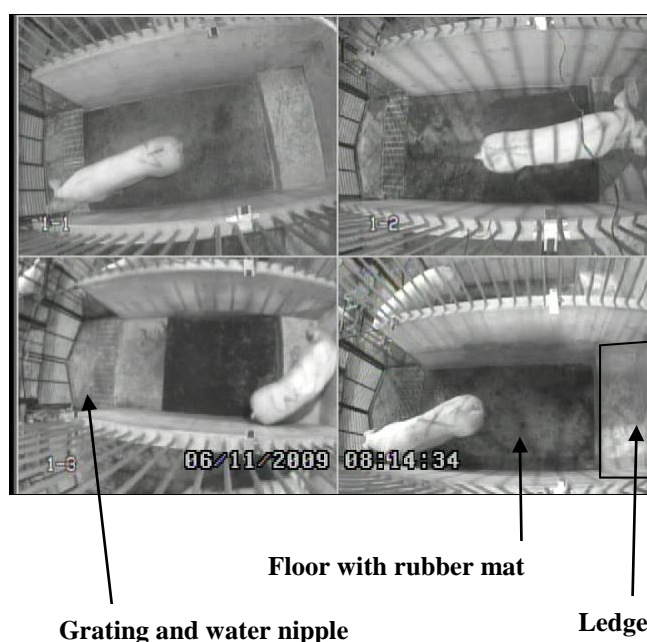
Treatments: Sows were all feed by hand and the ration was formulated to meet the NRC (1998) requirements for that sow at her stage of production. Data was collected on the afternoon feeding (1600 h) and each sow received 0.90 kg (2 lb). Each sow was removed from her home pen, the food was then placed either onto the floor (treatment one), or onto the ledge (treatment two). The sow was then allowed back into her pen and feeding rate was defined as when the sow placed her snout in the feed and stopped when all visible food was removed from the home pen.

Treatment One; Floor; defined as food being placed centrally 1 m in distance on the rubber mat from the back of the home pen (ledge width = 55 cm + 45 cm into home pen; Figure 1).

Treatment Two; Ledge; the ledge was defined as a raised concrete step (55 cm length x 55 cm in width x 24 cm depth; Figure 1).

Behavioral equipment and acquisition: Sow rate of feeding was collected on 11 sows in their home pens over a 20 d period. Scoring of feeding rate was conducted by live observation (one person to one sow). The person stood at the back of the home pen and observed the sows. All sows had been habituated to these observers prior to the commencement of the trial. Data were collected in seconds, using one stopwatch per sow.

Figure 1. Home pen configuration.

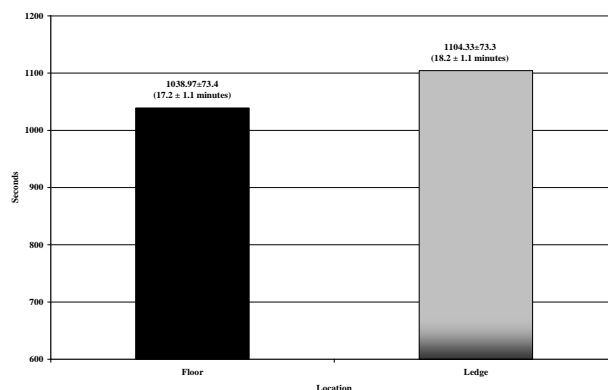


parameter of interest, (seconds) location and weight with sow body weight used as a covariate. A repeated measure statement of date nested within sow. A $P < 0.05$ was considered significant and PDIFF was used to separate the means. The feeding rate (sec) range for sows within parity will be presented descriptively.

Results and Discussion

No differences were found for parity ($P = 0.59$) of sow, although parity one sows ate quicker (14 mins) compared to parities two (20 mins), three (19 mins) and four (17 mins; Table 1). There was a difference ($P = 0.02$) for rate of feeding when sows were presented with feed on the floor of their home pen or on the raised feeder. Sows ate more quickly when floor feed than ledge feed (Figure 2).

Figure 2. Effect of location when feed was presented on the floor or ledge and time to consume feed ($P = 0.02$).



In conclusion there was no difference between rates of feeding for parity of sows when housed individually. However, when feed was presented on the floor, sows ate quicker compared to a raised ledge.

Acknowledgements

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Table 1. Effect of sow parity on time to consumer feed.

Measure	Parity				P-value
	1	2	3	4	
Seconds	846.4 ± 172.5	1216.4±176.9	1173.8±151.7	1050.1±140.7	0.59
Minutes	14.1±2.5	20.2±2.6	19.3±2.3	17.3±2.2	0.59
Range, seconds	614 to 1773	734 to 1705	654 to 1691	893 to 1405	.