The Economic Analysis of Feeding Cull Sows to Heavier Weights

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Summary and Implications

The objectives of this study were to estimate the amount of feed and associated costs of adding weight to cull sows, and, then to estimate the cost/benefit ratio of adding marketable weight to cull sows. As determined by last rib backfat, 8, 17, and 4 sows were classified into initial body condition scores of 1, 2, and 3, respectively. As sows' BCS increased, the efficiency of adding weight decreases. Average daily gain (ADG) and Feed:Gain (F:G) was greatest in sows that began the trial as a BCS 1 and increased 1 condition score. Both traits declined during the remainder of the trial within all initial BCS.

Introduction

Cull sow markets are divided into four weight categories with price per kg typically increasing as market weight increases. Significant value differences exist in cull sow base prices that could be captured by increasing sow market weight. However, there is limited information about the performance (ADG and F:G) and profitability of adding weight to modern lean-type genetic sows. Therefore, the objectives of this study were twofold: 1. Estimate the amount of feed and associated costs that are necessary to add weight to cull sows, and 2. estimate the cost/benefit of adding weight to cull sows that are from a modern, lean genetic line

Materials and Methods

Twenty-nine sows were purchased from a Mid-West integrated pork operation. The protocol requested thin sows with visual body condition scores of 1 or 2 and healthy in appearance. The sows were housed in an existing farrowing and nursery facility which had not contained pigs for more than 5 years. This facility contained 17 standard farrowing crates and 12 nursery pens where one sow was housed per crate or pen.

Sows were allowed 2 days for rest and acclimation to their new environment before beginning the trial. Sows were weighed and body condition was objectively and subjectively evaluated on every sow the day the trial began. Tenth and last rib backfat estimates along with loin eye area and loin depth were ultrasonically evaluated by a National Swine Improvement Federation certified real-time ultrasound technician. Backfat, approximately 6 cm off the midline at the last rib, was used to determine initial body condition for each sow. The range in millimeters of backfat over the last rib that classified each sow into body condition scores of 1 through 5 are shown in Table 1. Body weight, ultrasonic and other physical measurements were evaluated approximately every 14 days throughout the remainder of the trial.

Sows were fed twice daily and the amount of feed provided was recorded. The protocol required for feed to be available 23 h a day in order to accurately assess performance measures. Therefore, a sow feeding program was developed to incrementally increase the amount of feed given per feeding thereby decreasing the risk of sows being "off-feed". Beginning on the second feeding, all sows were increased 1.0 lb every fourth feeding. This program allowed for an incremental 1.0 lb increase every day until all feed from the previous feeding was not eaten or disappeared. At that point, total feed was decreased by approximately 2 to 4 lb per day.

Performance measures (ADG and F:G) were calculated from recorded feed intake (FI) and weight gain data. Feed disappearance was calculated as the feed provided minus the feed recovered at the next feeding. Sows remained on trial until either one of two conditions occurred. Either the sow reached a BCS of 5 or the sow failed to gain weight in 2 consecutive 14 day periods, at which point the sows were transported to the Iowa State University Diagnostic Laboratory, euthanized, and underwent a thorough necropsy evaluation.

Statistical analysis was performed using PROC MIXED of the SAS program. Initial BCS and room were included as fixed effects and initial weight nested within initial BCS was used as a linear covariate.

Results and Discussion

The number of sows that started the trial in each BCS and their corresponding ending BCS are shown in Table 2. As determined by last rib backfat, 8, 17, and 4 sows were classified into initial body condition scores of 1, 2, and 3, respectively. Eighty-six percent of the sows increased at least one BCS with over half of the total sows (58.6 %) completing the project's objective of reaching a BCS of 5. A total of 4 sows failed to improve a BCS score.

Cumulative performance trait averages are shown by initial BCS in Table 3. The values represent the estimated cumulative performance of adding 1, 2, 3, or 4 condition scores to each initial BCS. As sows' BCS increased, the efficiency of adding weight decreases. Gain:feed was greatest ($P = 0.03$) in sows that began the trial as a BCS 1 and increased 1 condition score. Both traits declined during the remainder of the trial within all initial BCS.

Thin sows that just weaned large litters of piglets could be possible candidate sows to add weight; whereas sows that have large amounts of variation in feed intake (possibly due to stomach ulcers) or appear morbid and lame are ideal for marketing after involution of the mammary tissue. Additionally, disease-laden sows could potentially contain a high mortality risk whereby no salvage value will be attained.

Herd health must be incorporated into the equation of feeding cull sows. Disease incidence can drastically increase break even prices and affect the profitability of feeding sows. In the present study, 8 sows required treatment for visual symptoms of disease, ranging from chronic lameness to metritis to pneumonia.

Many factors unique to individual operations must be evaluated before considering adding weight to cull sows. Foremost, the operation must be able to physically house prospect cull sows, and in this study, only cheap or depreciated facilities achieved break-even. Second, the producer must understand current market conditions and be able to predict future market trends. Finally, each producer should evaluate their sow operation and determine (based upon sow health and feed prices) if weight can be profitably added to cull sows. In this study, weight could be profitably added to cull sows in the presence of feed prices below $0.15 per kg and fixed costs below $0.50 per sow per day.

Table 1. Differentiation of body condition scores based upon millimeters of backfat[†].

SCORE	CONDITION	BACKFAT (Last Rib)		BODY CHARACTERISTICS
		MM	MM	
1	Emaciated	0	9.9	Hips, backbone, ribs prominent to the eye
2	Thin	10	15.9	Hips, backbone, ribs are easily felt without applying palm pressure
3	Ideal	16	22.9	Hips, backbone felt only with firm palm pressure, ribs easily felt but covered
4	Fat	23	29.9	Hips, backbone, ribs cannot be felt easily
5	Overfat	30	∞	Hips, backbone, ribs heavily covered.

[†] Values and description provided by the Tri-State Nutrition Guide

Table 2. Distribution of Body Condition Scores (BCS) of cull sows by beginning BCS.

	Ending BCS					
Beginning BCS	1	2	3	4	5	Total
1	1	1	.	3	3	8
2	1	2	1	3	10	17
3	.	.	.	.	4	4
Total	2	3	1	6	17	29

Table 3. Incremental LS means of performance traits of cull sows by initial body condition score.

		Increasing BCS			
Performance Parameter	Initial BCS	1	2	3	4
Feed:Gain (lb/lb)	1	2.30	3.84	4.14	5.02
	2	3.51	4.41	4.97	
	3	4.81	6.33		
Average Daily Gain (lb)	1	4.50	2.86	2.81	2.23
	2	3.56	3.01	2.88	
	3	2.11	1.79		
Average Feed Intake per day (lb)	1	10.70	11.30	13.75	11.67
	2	12.17	13.08	13.39	
	3	10.26	11.16		

† All calculations are the result of using healthy sows compared to sows not increasing one BCS.