Backfat Depth and Loin Eye Area Measurements of Purebred Berkshire Pigs Housed in Hoop Buildings in Iowa

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Summary and Implications

The variation in backfat of commodity pork has declined to the point some major packers are no longer measuring backfat depth. From our previous research with Berkshire pigs, a large amount of variation in backfat and loin eye area (LEA) still existed, especially between barrows and gilts. In our previous research, barrows average one inch backfat depth around 210 pounds whereas gilts did not achieve one inch until 260 pounds. This potentially may be a meat quality issue for gilts marketed less than 260 pounds

The objective of these trials was to replicate our previous study and to determine whether these differences persisted within a different set of Berkshire pigs under the same nutritional regimen. Understanding how feed programs and growth rates affect lean and fat deposition rates is a critical aspect to these niche programs in order to maintain consistency and quality of the Berkshire pork products marketed. Overall, barrows averaged an inch of backfat between 230 and 250 lb body weight whereas gilts average backfat was .90 inches at 269 pounds market weight. Only a 30% of the gilts within these two groups were over one inch backfat at market. These differences are crucial when selecting animals for market to achieve the highest desirability in meat quality within the Berkshire marketing system. These differences between barrows and gilts indicate it may be more critical that each are fed differently than in commodity pork production systems.

Introduction

The niche marketing of Berkshire pigs continues to grow in Iowa and the United States as the demand for high quality pork increases through the market chains. As the number of producers increases to meet the demand for Berkshire pork concerns about maintaining consistency and eating quality are growing. There is limited information available to characterize the backfat changes or percentage of lean within the Berkshire programs and consequently, no benchmarks exist for producers or guidelines for quality control of their products. This paper is the summary of the second phase to the Berkshire growth trials conducted at the ISU Western Research Farm, Castana, Iowa. As Berkshires have a reputation of being fatter and less efficient in feed conversion, it is important that to understand how these animals deposit fat and lean as they reach market weight. Characterizing compositional changes in backfat and muscle expression for purebred Berkshire pigs will enable more accurate feed formulation for meat quantity, quality and consistency.

The purpose of this project is to characterize typical backfat, LEA and percentage of lean for purebred Berkshire pigs in bedded hoop barns in Iowa.

Materials and Methods

This study was conducted at the Iowa State University Western Research Farm. Two distinct trials, winter (Trial 3) and summer (Trial 4), were conducted in order to include the environmental extremes of Iowa's climate. In each trial 36 Berkshire feeder pigs (18 gilts and 18 barrows) were purchased from the same genetic source as our first set of trials and housed in bedded mini-hoop barns.

The targeted grow-out was from 50 to 270 pounds of live weight. Pigs were allotted by sex and weight (light, medium, and heavy) of 6 pigs per pens; 2 pens per hoop. Gilts and barrows of similar weights were housed in one of three mini hoops which were divided into two pens of six pigs or 12 pigs per hoop.

Pigs were fed ad libitum a six-phase feeding program of corn-soybean meal based diets that met or exceeded amino acid requirements. Pigs were weighed (BWT) approximately every 21 days. Ultrasonic scans for 10^{th} backfat depth and LEA began at between 80 and 100 pounds. Thereafter scans were recorded approximately every six weeks with a minimum of four scans per pen. As pens neared the target market weight of 270 ± 5 lb, pigs were scanned at each weigh period. Ultrasonic percent lean was calculated by the equation:

%Lean = (0.833*gender - 16.498*Backfat + 5.425*LEA + 0.291*BWt-0.534) / BWt; (gender: barrows=1; gilts=2)

Results and Discussion

Summarized in the table below are the initial and final pig weights, ultrasonic scans of backfat and (LEA), and the calculated carcass percent lean (74% yield). Average trial weights were 92 and 83 pounds for the first scans and averaged 270 and 273 pounds for the off-test weights for trials 3 and 4, respectively. As expected, gilts averaged less backfat than barrows throughout the two trials; .34 vs.41inches at first scan and .90 vs 1.22 inches for the final scan, for gilts versus barrows, respectively. However, gilts had smaller LEA (2.37 vs 2.54 in^2) than barrows at first scanning but were larger (6.58 vs 6.40 in^2) than barrows for

the final scans. Berkshire hogs are not as lean as commodity lines, but the relative difference between barrows and gilts in percent lean were consistent. Overall gilts were leaner than barrows 50.5% vs 47.3%, respectively.

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Table 1. Live ultrasonic measurements and calculated percent lean of Berkshire pigs

		Body weight, lb		Backfat, in		Loin Eye Area, in^2		
Trial	Wt-Sex*	1st Scan Wt	Final	Initial	Final	Initial	Final	Carcass %Lean **
3	Lt-G	70	256	0.28	0.78	2.10	6.56	51.8
	Lt-B	86	271	0.38	1.41	2.30	5.82	44.1
	Md-G	79	273	0.30	0.77	2.29	6.85	52.1
	Md-B	101	272	0.46	1.31	2.86	6.67	47.6
	Hy-G	101	274	0.40	1.04	2.60	6.33	48.9
	Hy-B	113	272	0.48	1.20	3.02	6.54	48.3
4	Lt-G	74	270	0.33	0.88	2.08	6.73	51.1
	Lt-B	68	275	0.32	1.24	1.95	6.20	46.3
	Md-G	81	269	0.36	0.96	2.44	6.67	50.3
	Md-B	85	279	0.40	1.14	2.35	6.23	47.1
	Hy-G	87	271	0.37	0.99	2.50	6.33	48.9
	Hy-B	94	274	0.40	1.01	2.95	6.96	50.2
3	G	83	267	0.33	0.86	2.33	6.58	50.9
	B	100	272	0.44	1.31	2.72	6.34	46.7
4	G	80	270	0.35	0.94	2.34	6.58	50.1
	B	83	276	0.37	1.13	2.42	6.46	47.9
Overall	Trial 3	92	270	0.39	1.09	2.53	6.46	48.8
	Trial 4	81	273	0.36	1.04	2.38	6.52	49.0
	Gilts	82	269	0.34	0.90	2.34	6.58	50.5
	Barrows	91	274	0.41	1.22	2.57	6.40	47.3
	All pigs	87	271	0.37	1.06	2.45	6.49	48.9

* Lt= light, Md= medium, Hy = heavy weight; G = gilts; B = barrows;

** %Lean = (0.833*gender - 16.498*Backfat + 5.425*LEA + 0.291*BWt-0.534) / BWt * 74%