Growth Performance and Ultrasonic Scan of Purebred Berkshire Pigs Housed in Hoop Buildings in Iowa (Trials 3 and 4)

RFR-A1368

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Introduction

A certified Berkshire program continues to lead niche pork production markets based on its meat quality advantage over commodity-based pork. This economic incentive is especially valuable for smaller, more traditional pork producers. The disadvantages of Berkshire pigs are fatter carcasses, slower gains, and less efficient feed conversion compared with commodity pork production. Consequently, these pigs often are a better fit for less intensive or lower cost production systems.

Most Berkshire niche pork production systems require access to bedding and limit the use of antibiotics and feeding of animal proteins. In Iowa, Berkshire pork producers often raise their pigs in existing older bedded barns or hoop barns because these systems match the housing requirements of their markets. Housing influences the thermal environment that pigs experience and thus influences growth rate and nutritional requirements of growing pigs.

Better understanding of feed intakes, growth rates, and lean and fat deposition are needed for these unique purebred pigs. Establishing parameters for each of these benchmarks would enable nutritionists to more closely match diet formulations with needs of growing pigs. Precisely matching the nutrient profile of diets with nutritional needs of growing pigs is needed to reduce excretion of nutrients into the environment. Delivering the correct nutrient profile to support growth and development, while avoiding excess nutrients, also will help minimize feed costs. The starting point for developing a precise nutrition program for Berkshire pork is to accurately know the feed intake and growth rate of purebred Berkshire pigs from weaning to market weight. Better characterization of how purebred Berkshire pigs eat and grow will enable more accurate feed formulation for this type of pig raised in bedded systems.

The objective of this project was to characterize typical growth, feed intake, backfat, and loin eye changes of purebred Berkshire pigs in bedded hoop barns in Iowa.

Materials and Methods

The study was conducted at the Iowa State University Western Research Farm, Castana, Iowa. This was a repeat of our first two trials with Berkshire pigs. Pigs were placed in the winter and summer months in order to include the environmental extremes of Iowa's climate. In each trial, 36 Berkshire feeder pigs (18 gilts/18 barrows) were purchased and housed in bedded mini-hoop barns.

The targeted weight range was from 50 to 270 pounds of live weight. Due to the variation in size and weight, pigs were allotted by sex and weight (light, medium, and heavy) of six pigs/pens and two pens/hoop. The incoming weights varied from 45 to 86 lb (average=61) and 35 to 65 lb (average=51) for

Trials 3 and 4, respectively. Gilts and barrows of similar weights were housed in one of three mini-hoops, which were divided into two pens.

Pigs were fed a six-phase ad libitum program of corn and soybean meal-based diets that met or exceeded amino acid requirements. Weight breaks for diet changes were 90, 135, 180, and 225 lb average pen weight. At 21-day intervals, pigs were weighed and feed consumption recorded until pens averaged 270 ± 5 lb to characterize growth and intakes.

Ultrasonic scans for backfat depth and loin eye area (LEA) began between 80 and 100 lb. Thereafter, scans were recorded approximately every six weeks with a minimum of four scans/pen. As pens neared the target market weight of 270 ± 5 lb, pigs were scanned at each weigh period. 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

Table 1 summarizes the growth performance of the two trials (T3-winter, T4-summer) and weight by gender/pen grouping. Barrows grew faster (117 vs. 128 days; average of Trials 3 and 4) and were heavier than gilts in both trials (274 vs. 269 lb, barrows and gilts respectively). Gilts consumed less feed (5.48 lb/d) than barrows (6.28 lb/d). Overall, both barrows and gilts consumed more feed per day during the winter than summer (barrows, 6.51 vs. 6.05 lb/d; 5.76 vs. 5.20 lb/d). Gilts were more efficient than barrows in converting feed to gain (3.23 vs. 3.42), but grew slower than barrows (1.70 vs. 1.84 lb/d). Growth rates were similar between seasons for both barrows and gilts.

Summarized in Table 2 are the initial and final pig weights, ultrasonic scans of backfat and loin eye area, and the calculated carcass percent lean (74% yield). Average trial weights were 92 and 83 lb for the first scans and averaged 270 and 273 lb for the off-test weights for summer and winter trials, respectively. As expected, gilts averaged less backfat than barrows throughout the two trials (.34 vs. .41 in. at first scan and .90 vs. 1.22 in. for the final scan). 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%).

In our previous research, the barrows averaged one-inch backfat depth at 210 lb and gilts had one-inch backfat at 260 lb. This trial had the barrows with an inch of backfat between 230 and 250 lb body weight and gilts with .90 in. backfat at 269 lb. Only 30 percent of the gilts in these studies 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. The differences between barrows and gilts indicate that it may be more critical to feed the genders differently than in commodity pork production systems. There may be a potential meat quality issue for gilts marketed less than 260 lb because of carcasses that are too lean.

Summary and Implications

Berkshire pigs make up the majority of the niche market pig population. Although niche pork production has increased across Iowa and the United States and demand continues for high quality pork, there remains a lack of production standards for niche pork producers to benchmark their performance against. This

study was to replicate our earlier work and add to the database of niche pork production.

For this group of Berkshire pigs, growth rate was better than earlier research reports, but less than our previous trial. Feed conversions (feed-to-gain) also were better than other research, but similar to our earlier work. Barrows grew faster and consumed more feed, but gilts were more efficient converting feed to gain. Although seasonal feed intakes differ for both genders, the growth rates were similar within gilts and barrows.

The variation in backfat of commodity pork has declined to the point that 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 still exist, especially between barrows and gilts.

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.

Acknowledgements

We gratefully acknowledge Don Hadden, Harry Riesberg, and Jacob Clemon for their assistance in the feeding, weighing, and care of the pigs during these trials. We also thank Dallas MacDermot (MacScan) for ultrasonic scanning of the pigs.

Table 1. Growth performance of Berkshire pigs.*

Trial	Gender	Initial wt. (lb)	Final wt. (lb)	Days on feed/d	ADFI, lb/d	ADG, lb/d	F:G
	Winter (T3)	61	270	118	6.14	1.77	3.47
	Summer (T4)	50	273	126	5.63	1.77	3.18
Overall	Gilts	53	269	128	5.48	1.70	3.23
	Barrows	59	274	117	6.28	1.84	3.42
	All pigs	56	271	122	5.88	1.77	3.32

*ADFI=Average Daily Feed Intake, ADG=Average Daily Gain, F:G=ADFI/ADG.

Table 2. Live ultrasonic measurements and calculated percent lean of Berkshire pigs.*

		Body weight (lb)		Backfat (in.)		Loin eye area (in.^{2})		
Trial	Wt-Sex*	Initial wt. (lb)	Final wt. (lb)	Initial wt. (lb)	Final wt. (lb)	Initial wt. (lb)	Final wt. (lb)	Carcass % lean**
	Winter (T3)	92	270	0.39	1.09	2.53	6.46	48.8
	Summer (T4)	81	273	0.36	1.04	2.38	6.52	49.0
Overall	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

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