

## CHARACTERIZATION OF RAPID AND SLOW GROWING LINES OF PIGS

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### Story in Brief

Lines of pigs were developed emphasizing rapid growth rate (RGL) and slow growth rate (SGL) during the growing and finishing periods. Litter size and individual pig weights were measured for 196 litters at birth, 21 and 42 days of age. Average daily gain, pen feed efficiency and backfat thickness were obtained for 70 pens with a total of 1066 barrows and gilts.

RGL litters were larger and pigs were heavier at all three ages. The differences in pig weight were significant at birth and 42 days ( $P < .01$ ). RGL barrows and gilts grew faster during both the growing and finishing periods ( $P < .01$ ), were more feed efficient ( $P < .05$  for finishing period) and had thicker backfat at 220 lb ( $P < .01$ ). These results suggest that growth rate selection will result in many favorable changes, but further clarification of the influence of feed intake on efficiency of gain is desirable for effective development of selection programs.

### Introduction

Growth rate is an important contributor to efficiency during the postweaning phase of a swine enterprise. It has been demonstrated that selection is effective for increasing growth rate in pigs. It is a part of most recommended indexes for use on the farm or in test stations. Some of the relationships between growth rate and other traits are not well understood. A study has been initiated to investigate feed intake, lean tissue growth rate and lean tissue feed efficiency of pigs selected for rapid or slow growth rate. The purpose of this report is to characterize the performance of these lines following three years of selection.

### Materials and Methods

Two lines of pigs have been established which emphasize rapid growth rate (RGL) and slow growth rate (SGL). These lines were founded with crossbred gilts at the Southwest Livestock and Forage Research Station and Hampshire and Duroc boars purchased from test stations. The boars had either high or low index values based on average daily gain, feed efficiency and backfat thickness. Growth rate differences contributed heavily to index differences in the boars. High indexing Duroc boars were mated to gilts sired by high indexing Hampshire boars to form RGL. Low indexing boars were used similarly for SGL.

Following foundation, the lines were subjected to an additional cycle of selection for either rapid or slow growth rate from 9 weeks to

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220 pounds. All gilts were available for selection and two randomly chosen boars from each litter were left intact. Each line has been maintained with 8 boars and 50 sows each farrowing season. The pigs and litters evaluated in this study are the offspring of those boars and gilts that went through the additional cycle of selection.

Litter size and pig weight were measured at birth, 21 and 42 days of age. Creep feed was provided at 21 days, and pigs were weaned at 42 days. All fully-formed pigs were included at birth. Average daily gain and pen feed efficiency were obtained for the growing phase (9 weeks to pen average 120 lb) and the finishing phase (end of growing phase to 220 lb). All pigs were in pens of 14 to 18 pigs and were fed ad libitum. Backfat thickness was measured with an ultrasonic probe at 220 lb.

### Results and Discussion

RGL litters were larger and pigs were heavier at birth, 21 and 42 days (Table 1). The differences in pig weight were significant ( $P<.01$ ) at birth and 42 days. This favorable relationship between growth rate and traits associated with sow productivity is encouraging since improvement in sow productivity has been difficult to obtain in the industry. However, the differences in pig growth occurred prior to birth and after 21 days of age. This suggests that preweaning growth may be due more to the pigs' own ability to grow and not to superior maternal ability of the RGL sow.

RGL barrows and gilts grew faster during both the growing and the finishing phases ( $P<.01$ , Table 2). They were also more efficient. Average daily feed intake for RGL was .32 lb/day more during the growing phase and .54 lb/day more during the finishing period. Feed intake differences apparently contributed to the observed differences in growth rate. RGL barrows and gilts also had thicker backfat than SGL ( $P<.01$ ).

The increases in fat deposition and feed intake require further investigation. The currently accepted practice of selecting for increased growth rate and decreased fat thickness among pigs fed ad libitum may not be the most efficient procedure for improving efficiency of lean tissue deposition. Other feeding regimes may be required so that we are not placing as much emphasis on increased feed intake while selecting for rapid growth rate. The effect that selection for increased growth rate has on maintenance of the sow herd also needs to be investigated.

Table 1. Litter size and weights of pigs at birth, 21 and 42 days of age.

	N <sup>a</sup>	Litter size			Pig weight (lb)		
		Birth	21 days	42 days	Birth	21 days	42 days
Rapid-growth line	97	9.76	7.50	7.28	3.28**	11.35	24.92**
Slow-growth line	99	9.28	7.22	7.01	3.17	11.25	23.28

\*\*Pigs from rapid-growth line were significantly heavier ( $P<.01$ ).

<sup>a</sup>Number of litters.

**Table 2. Growth rate, backfat thickness and feed efficiency of barrows and gilts.**

	N <sup>a</sup>	Average daily gain (lb/day)			Backfat thickness(in)	lb feed/lb gain		
		Grower <sup>b</sup>	Finisher <sup>c</sup>	Overall		Grower	Finisher	Overall
Rapid-growth line	589	1.53**	1.85**	1.69**	1.08**	2.70	3.54*	3.16
Slow-growth line	517	1.40	1.67	1.53	1.02	2.72	3.60	3.20

\*Pigs from rapid-growth line had significantly ( $P<.05$ ) better feed efficiency during finishing period.

\*\*Pigs from rapid-growth line had significantly higher growth rate and backfat thickness ( $P<.01$ ).

<sup>a</sup>Number of pigs.

<sup>b</sup>Period before pens averaged 120 lbs.

<sup>c</sup>Period after pens averaged 120 lbs.

<sup>d</sup>Pen feed efficiency .35 pens from each line.