

SELECTING A PIG STRAIN FOR FASTER GROWTH AND MEASURING ITS IMPROVEMENT ON DIFFERENT RATIONS

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KEYPOINTS: Pigs selected for growth on restricted feeding produce offspring which are profitable on both restricted and *ad libitum* feeding. After three generations of selective breeding for fast growth on restricted feeding, a line of pigs was grown on both restricted and on *ad libitum* feeding. On both levels of feeding, profitability was increased by about \$6 per pig. On restricted feeding, most of the improvement came from an increase in carcase weight; and on *ad libitum* feeding, the improvement was mostly due to less fat and less wasted food.

This work tested the theory put forward by McPhee et al (1988) that pigs which grew quickly on a restricted ration scale produced offspring which grew faster, had leaner carcasses and wasted less food. Further, these advantages occurred on both restricted and *ad libitum* feeding. To test this, two lines of pigs were selected for growth rate for three years. Growth rate was measured over a 6 week period starting at 50 kg. In accordance with modern practices in genetic investigations, one line was selected upwards and the other downwards for growth rate. Over the test period, pigs of both lines were all fed the same total amount of grower food, restricted to an estimated 80% of average *ad libitum* intake. Fat depth was measured at P₂ at the end of test but was not used to select breeding stock.

Some pigs were also taken from the lines and grown on *ad libitum* feeding for comparison with those performance tested on restricted feeding. The improvement in the lines from three years of selection was measured as breeding values on these two levels of feeding. A breeding value is that part of a change in a performance trait which is genetic and therefore transmissible

to future generations. Breeding values for growth rate, food conversion ratio, fat and food intake (appetite) were estimated using PEST (Groeneveld, 1990). Changes in average breeding value for all traits over three years of selection were similar in the high and low lines.

Table 1 shows the means at the start and the estimated change over the three years of selection in the high growth line (half the difference between the high and low lines) on restricted and *ad libitum* feeding. The high line exhibited an increase in growth rate and reductions in food conversion ratio, fat and food intake. The increase in growth was greatest on restricted feeding and the reduction in fat greatest on *ad libitum* feeding. The reduction in food conversion ratio was about the same on both feeding levels. Applying economic values calculated by McPhee and Macbeth (2000) valued high line gains from selection at about \$6 per pig on both restricted and *ad libitum* feeding. This indicates that a restricted feeding regimen during performance testing is suitable for selecting breeding pigs whose descendants are grown on both restricted and *ad libitum* feeding although the contribution of different traits varies with feeding level.

Table 1. Means of traits at the start and responses in breeding values to three years of selection for high growth rate. Measurements made on *ad libitum* and restricted feeding.

Feeding levels Trait	Restricted			<i>Ad libitum</i>		
	Start	Response	^a s.e	Start	Response	^a s.e
Weight gain (kg/d)	0.75	0.03	0.00	0.94	0.01	0.00
Food intake (kg/d)	2.11	0.00	0.00	2.70	-0.10	0.03
Food conv. ratio	2.86	-0.11	0.01	2.92	-0.12	0.02
Fat at P ₂ (mm)	11.8	-0.07	0.01	12.4	-0.55	0.16
Number of pigs		2120			542	

^astandard error of response

Keywords: Selection, lean-growth, restricted and *ad libitum* feeding

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