

SELECTION FOR EFFICIENT LEAN GROWTH ON RESTRICTED FEEDING: 1. GENETIC PARAMETERS.

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It is expected that selection for increased growth rate on a fixed ration over a fixed time period will exploit variation in the efficiency of food utilisation, associated with variation in lean relative to fat deposition. This should lead to a reduction in fat, in energy used for maintenance, and an increase in lean growth rate. To test this hypothesis, two lines of 36 sows and 6 boars were newly established from sampling within litters of an outbred Large White population free of the halothane gene. They are being divergently selected for high and low growth rate over a 6 week period starting at 50 kg live weight. Over the test period, all pigs are fed the same fixed ration restricted to 80% *ad libitum* intake measured in a test on unselected foundation animals. The diet contains 14 MJ DE, 0.65g/MJ available lysine. Measurements are made of live weight and ultra sonic P2- backfat thickness at the end of the test.

This paper reports estimates of genetic parameters on 1751 pigs in the two lines from the foundation to the third generation of selection. Variance and co-variance components were estimated using a restricted maximum likelihood procedure (REML), multi-trait REML algorithm was used to allow simultaneous estimation of multiple random effects (ASREML) (Gilmour *et al.*, 1999). Fixed effects were batch and sex, and animal was the random effect. The same model is used for the analysis of average daily gain (ADG), P2- fat, and food conversion ratio (FCR). Estimates of genetic parameters are given in Table 1.

Table 1: Heritabilities (diagonal), phenotypic and genetic correlations (above and below diagonal) on restricted feeding.

Traits	ADG	P2-fat	FCR
ADG	0.26 (0.04)	-0.11 (0.03)	-0.94 (0.00)
P2-fat	-0.23 (0.13)	0.33 (0.05)	0.11 (0.03)
FCR	-0.99 (0.00)	0.25 (0.14)	0.27 (0.05)

Standard error in parenthesis

The magnitude of the heritabilities and the direction and magnitude of the correlations are consistent with results on restricted feeding reported by McPhee *et al.* (1988) and Nguyen *et al.* (unpublished data, 1999). The phenotypic and genetic correlations between ADG and FCR, close to -1.0, reflect a very low variation in food intake (Coefficient variation =2.5%), the numerator of the ratio. These parameter estimates predict that selection for increased growth rate will simultaneously reduce fatness and FCR as found by McPhee *et al.* (1999).

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