

## SELECTION CRITERIA IN THE BREEDING OF PIGS FOR LEAN TISSUE GROWTH

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Improvement of lean tissue feed conversion has been suggested as a breeding objective which emphasises biological efficiency in pigs. This approach is an alternative to the conventional selection index which includes economic parameters that may change in a relatively short time (Fowler et al. 1976). These authors proposed that a measurement of lean tissue growth rate be used as a selection criterion because it was the most important component of the breeding objective.

In this study, lean tissue growth rate in the ham (LTGRH) is used as an index of overall lean tissue growth rate because of the strong relationship between muscle content of the ham and that of the carcass (Evans and Kempster 1979). Left hams were dissected from 30 male and 38 female pigs fed at approximately 80% of *ad lib.* intake and slaughtered at 82 kg in batches over a period of 6 months. LTGRH was calculated by dividing the weight of dissectable lean in the ham by the age of the animal. Least square means of several live animal and carcass characters and their residual correlations with LTGRH after removing the effects of months and sex are given in Table 1.

TABLE 1 Selected means and correlations with LTGRH (n = 68)

Character	Mean	SE	Correlation
LTGRH (g/d)	19.0	0.35	1.00
Growth rate (g/d)	382	6.40	0.89
Live weight (kg)	82.3	0.96	0.43
P2 fat (mm)	16.7	0.40	-0.06
Carcass grade (1 to 3)	1.2	0.07	-0.28
Lean in ham (%)	67.1	0.36	0.30
Fat in ham (%)	16.4	0.41	-0.30

A prediction equation for LTGRH was derived by least squares analysis using a model containing months and sexes as fixed effects and live animal growth rate (GR) and ultrasonic P2 fat depth (P2) as covariables. Preliminary analyses had shown that slaughter weight and square root transformation of P2 did not increase the multiple correlation and that separate equations for each sex did not differ. The prediction equation derived was:

$$\text{LTGRH (g/d)} = 2.67 + 0.05 \text{ GR (g/d)} - 0.16 \text{ P2 (mm)}.$$

The residual standard deviation was 1.037 g/d and the multiple correlation 0.913.

Estimated LTGRH was calculated for 700 pigs from 137 litters produced by 75 sows mated to 11 boars. The pigs were bred at the University's piggery during 1978-79. The between-sire variance in LTGRH was highly significant and the heritability was  $0.28 \pm 0.13$ . The genetic correlations between LTGRH and both GR and P2 were  $0.92 \pm 0.06$  and  $-0.16 \pm 0.36$  respectively. In contrast to the dissection study the phenotypic correlation between estimated LTGRH and P2 was positive (0.28) and significant.

This study shows that LTGRH can be estimated accurately by an index of GR and P2 and it indicates that selection for the index should result in increased live animal growth with little change in fatness.

FOWLER, V.R., BICHARD, M. and PEASE, A. (1976). *Anim. Prod.* **23**: 365.

EVANS, D.G. and KEMPSTER, A.J. (1979). *Anim. Prod.* **28**: 97.

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