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GENETIC PARAMETERS OF CARCASS TRAITS IN THE

NEW ZEALAND ROMNEY

A thesis presented in partial fulfilment of the requirements  
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ABSTRACT

The data used in the present study were collected from wether lambs of a flock of New Zealand Romney sheep started at Massey Agricultural College, Palmerston North, in 1944. The lambs, 474 in number, were the progeny of 12 mixed-age rams born over a period of three years from 1944 to 1947. Altogether, 25 carcass traits were analysed.

A linear mathematical model, which included sire, year and type of birth and rearing as the main effects, a sire-year interaction term and age at slaughter as a covariate, was used to describe the data. The estimates of the various terms in the model were derived by least-squares procedures. Preliminary analyses included determining the significance of the sire-year interaction in each of the 25 traits. In traits where the sire-year interaction were found not significant, the main effects and regression term were estimated.

Variance components were estimated using Henderson's Method III. Heritability was estimated by paternal half-sib correlation. The procedures used in the estimation of covariance components were, in many ways, similar to those used in the analysis of variance components. In the former, the sums of crossproducts for the appropriate effects were computed from the difference

between two reductions in sums of crossproducts.

Sire-year interaction was found to be significant in four traits, namely width of gigot (G) and the ratio of the weight of the forequarter to the hindquarter (FQ/HQ) at the 1% level of probability and, carcass grade and cannon bone weight at the 5% level of probability.

Estimates of heritability of carcass traits are as follows:

Internal measurements: A,  $1.11 \pm 0.27$ ; B,  $0.20 \pm 0.12$ ; C,  $0.31 \pm 0.14$ ; D,  $0.27 \pm 0.13$ ; X,  $0.09 \pm 0.08$ ; Y,  $0.28 \pm 0.14$ ; J,  $0.35 \pm 0.15$ .

Measurements indicative of bone length and weight: F,  $0.73 \pm 0.22$ ; T,  $0.62 \pm 0.20$ ; R,  $0.55 \pm 0.19$ ; P,  $0.70 \pm 0.22$ ; Cannon bone length,  $0.80 \pm 0.23$ ; cannon bone weight,  $1.01 \pm 0.26$ .

Measurements indicative of width or depth of body: G,  $0.41 \pm 0.17$ ; WR,  $0.14 \pm 0.10$ ; WF,  $0.09 \pm 0.08$ ; WTh,  $0.37 \pm 0.16$ ; Th,  $0.67 \pm 0.21$ .

Measurements indicative of length of body: K,  $0.34 \pm 0.15$ ; L,  $0.55 \pm 0.19$ ; H,  $0.20 \pm 0.12$ .

"Other" carcass traits: carcass weight,  $0.03 \pm 0.04$ ; carcass grade,  $-0.04$ ; carcass total,  $0.34 \pm 0.15$ ; FQ/HQ, 0.00.

Estimates of genetic correlations showed large sampling errors. The correlations between the ratio of the weight of the forequarter to the hindquarter (FQ/HQ) and the other carcass traits were not included because the sampling errors were very large. In the majority of cases, the genetic correlations were of the same sign as the phenotypic correlations.

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