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THE ESTIMATION OF GENETIC AND PHENOTYPIC
PARAMETERS FOR A SYNTHETIC LEAN MEAT
AND WOOL SHEEP BREED

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ABSTRACT

A study of the inheritance and interrelationships between wool, growth and carcass traits was carried out as part of the development of a large lean white-faced sire breed. Cross-bred progeny, from three sire breeds (Romney, Dorset, and Border Leicester) mated to Romney ewes, provided information on carcass fatness and composition, liveweight, ultra-sonic backfat depth, fleeceweight and objective measures of fleece characteristics. An overall total ~~a total~~ of 28 sires and 765 progeny were used to collect this information.

The analysis of half-sib records was carried out under an assumption of positive assortive mating on ultra-sonic backfat depth. It was considered that any bias, relative to random mating, was minimal due to incomplete assortment, dominance, epistasis and crossbreeding influences. It was assumed that the progeny were only half-sibs in relation to breed, and thus the between-breed component only estimated one-quarter of the between-breed variance. Further, the sires were nested within their respective breeds. The data corrected for the significant non-genetic effects before the variance and covariance components were estimated.

In general, the estimates of the Within-breed heritability for the wool and growth traits ranged from 0.1 to 0.6 and were similar to literature values. The carcass estimates were higher than literature values in most cases. The incorporation of the between-breed component resulted in the between-breed heritability being larger in magnitude.

This may have been due to non-additive genetic effects, such as heterosis, in the between-breed component. The ratio of the between-breed genetic variance to the total genetic variance indicated that there was large between-breed variation in liveweight and wool traits and small variation in the carcass traits.

The total genetic and total phenotypic correlations presented here suggest that selection for lean growth and wool production can be accomplished by the joint selection of liveweight and greasy fleeceweight. Expected correlated responses in the other traits would include: a) increase liveweight and fleeceweight at all ages, increase ultra-sonic fat depth, GR measurement, lean content, clean fleeceweight, staple length, mean fibre diameter, clean scoured yield, and b) decrease the carcass C measurement, decrease bone and fat contents, and loose wool bulk.

Selection against ultra-sonic backfat depth would result in leaner animals at a constant weight. But the moderately positive correlations with liveweight and fleeceweight would appear to negate the associated advantage of a reduction in carcass fatness.

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