

GENETIC PARAMETERS AND TRENDS FOR HOGGET TRAITS IN MERINO LINES DIVERGENTLY SELECTED FOR MULTIPLE REARING ABILITY

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SUMMARY

Data were recorded for hogget live weight (LW), clean fleece weight (CFW), fibre diameter (FD), wrinkle score (WS) and scrotal circumference (SC) of a resource population divergently selected from the same base since 1986, either for (H line) or against (L line) maternal multiple rearing ability. Estimates of direct heritability (*SE*) were 0.38 (0.05) for LW, 0.28 (0.05) for CFW, 0.52 (0.04) for FD, 0.54 (0.04) for WS and 0.37 (0.07) for SC. Maternal genetic effects were significant for LW and CFW, amounting to 0.09 (0.03) and 0.08 (0.03), respectively. Genetic correlations of LW with CFW and FD were positive and moderate. The genetic correlation of LW with WS was moderate and negative. Fleece weight was positively related to FD and WS. The genetic correlation of LW with SC was high and positive. Genetic trends in the H and L line indicated divergence ($P < 0.05$) in the case of LW, WS and SC. Animals in the H line became heavier and plainer with a higher SC, while the opposite trends applied in the L line. A similar basis seemed to exist for the observed genetic divergence in LW and SC, as divergence in SC was reduced when LW was included as a covariate.

Keywords: Fibre diameter, fleece weight, wrinkle score, scrotal circumference

INTRODUCTION

Several sets of estimates for traits of economic importance in sheep have been reported since computer software and hardware for the partitioning of genetic variances into direct additive effects, maternal additive effects, their covariance and maternal permanent environmental effects became readily available. Estimates of heritability and significant maternal effects for wool traits have been extensively reviewed by Safari and Fogarty (2003). Mature breeding ewes of a line that was selected for an increased multiple rearing ability produced less greasy wool than ewes in a line selected against multiple rearing ability (Cloete *et al.* 2003). Genetic correlations of reproduction with wool yield were not significant (Cloete *et al.* 2004), while it was positive in other studies (Snyman *et al.* 1998). The study of correlated responses in wool yield to selection for an increased reproduction rate thus seems relevant. Genetic correlations of weight of lamb weaned per breeding ewe with fibre diameter were unfavourable, albeit not significantly so (Snyman *et al.* 1998). Testis measurements of rams are considered as indirect selection criteria for reproduction rate in sheep (Purvis *et al.* 1988). It has recently been shown that the testis size of breeding rams is related to the conception of the ewes they were mated to (Duguma *et al.* 2002). A moderate genetic correlation of scrotal circumference with number of lambs weaned was also established recently (Apps *et al.* 2003). Genetic trends that resulted from divergent selection for and against ewe multiple rearing ability were studied against this background, to get an indication of correlated responses. Genetic and environmental (co)variances for hogget traits were obtained simultaneously.