

GENETIC VARIATION IN TRACE ELEMENT STATUS OF MERINO SHEEP

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Genetic variation accounts for part of the differences in trace element concentrations in blood and tissues between and within breeds of livestock (see Littledike and Young 1993). The present study was undertaken to obtain preliminary estimates of the heritability of trace element concentrations in the liver of Merino sheep.

“Ashrose” Merino sheep were raised at Cape Borda Research Farm on Kangaroo Island, South Australia. In each of 3 years (1982-84) each of 8 randomly selected rams was mated to different groups of about 40 randomly selected ewes. The wether progeny were given a selenium pellet at weaning (3-4 months of age) and were slaughtered at 18 months of age at a commercial abattoirs. Liver samples collected at slaughter were assayed for trace elements using the procedures described by Gaughwi *net al.* (1984). Heritabilities and phenotypic correlations were estimated by analysis of variance and covariance (Becker 1984).

Liver samples were obtained from 208 wethers, progeny of 22 sires. Table 1 gives a summary of the findings, including the mean liveweight of wethers. The mean trace element concentrations in liver were normal for all elements. Heritability estimates were high for all traits except for manganese concentration. The phenotypic correlations were moderate between copper and selenium and between zinc and manganese but were low for all other correlations . Because of the small number of sires involved in our study heritability estimates have large standard errors and the genetic correlations are not reported.

Table 1. Mean values (± SD), heritability estimates (± SE) and phenotypic correlations for the concentration of selenium (µmol/kg dry matter) and other trace elements (mmol/kg dry matter) in liver and liveweight (kg) of Merino wethers, aged 18 months

	Copper	Zinc	Manganese	Selenium	Liveweight
Mean	6.7±2.6	2.4±0.69	0.16±0.04	9.0±4.6	46±7.0
Heritability	0.60±0.32	0.52±0.28	0.0±0.0	0.43±0.29	0.58±0.32
<i>Phenotypic correlations</i>					
Copper	-	0.07	0.15	0.22	-0.07
Zinc		-	0.38	-0.02	-0.01
Manganese			-	0.14	-0.11
Selenium				-	0.06

Our findings suggest the presence of genetic variation in trace element concentrations in the liver of Merino sheep.

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