

**GENETIC AND PHENOTYPIC PARAMETERS FOR GREASY AND SCOURED WOOL COLOUR
IN SOUTH AUSTRALIAN MERINO SHEEP**

P.J. JAMES^A, R.W. PONZONI^A, J.R.W. WALKLEY^A AND K.J. WHITELEY^B

^A Department of Agriculture, GPO Box 1671, Adelaide, South Australia, 5001

^B CSIRO Division of Wool Technology, Ryde, New South Wales, 2112

INTRODUCTION

Scoured wool colour significantly affects the value of wool top, yarn and cloth. There is now an Australian Standard for the measurement of scoured yellowness and wool producers can have yellowness measured on sale lots (Teasdale 1988). Accurate specification of scoured colour should enable the calculation of its economic weight and open the way for its rational incorporation into breeding objectives. However, the only estimates of genetic parameters for scoured wool colour in Merino sheep are from unpublished work of Jackson and Engel cited by Whiteley and Jackson (1982) in Peppin Merinos.

This paper reports genetic and phenotypic parameters for greasy and scoured wool colour in South Australian Merino sheep.

MATERIALS AND METHODS

Observations were made over 6 years on 805 female and male progeny of 44 sires from a daughter stud of the Collinsville family group. The environment and management of the sheep are described by James *et al.* (1987). Greasy and scoured colour were measured as the tristimulus values X, Y and Z with a Hunterlab D25 D2M Colour Difference Meter. Yellowness (YZ) was calculated by $Y-Z$ and yellowness index (YI) by $100(1.28X - 1.06Z)/Y$. Greasy colour (COL) was also visually scored from 1 (white) to 7 (yellow).

Heritabilities and genetic and phenotypic correlations were estimated by analysis of variance and co-variance as described by James *et al.* (1987).

RESULTS AND DISCUSSION

The heritability estimates for measures of scoured and greasy wool colour were moderate to high indicating that genetic improvement can be made by selecting for these characters in a breeding programme (Table 1).

Table 1: Means and standard deviations (sd) and heritabilities and standard errors (se) of measures of scoured and greasy wool colour

	SCX ^a	SCY	SCZ	GRX	GRY	GRZ	SCYZ	SCYI	GRYZ	GRYI	COL
Mean	64.7	66.9	65.5	48.7	49.4	39.2	1.5	20.3	10.2	42.3	2.95
(sd)	(1.7)	(1.7)	(2.4)	(3.4)	(2.4)	(4.3)	(0.9)	(1.5)	(1.3)	(4.4)	(0.82)
Heritability	0.58	0.56	0.54	0.32	0.43	0.57	0.42	0.35	0.64	0.69	0.42
(se)	(0.16)	(0.16)	(0.16)	(0.12)	(0.14)	(0.16)	(0.14)	(0.13)	(0.17)	(0.18)	(0.13)

^a SCX = Scoured X; SCY = Scoured Y; SCZ = Scoured Z; GRX = Greasy X; GRY = Greasy Y; GRZ = Greasy Z; SCYZ = Scoured yellowness; SCYI = Scoured yellowness index; GRYZ = Greasy yellowness; GRYI = Greasy yellowness index; COL = Greasy colour score.

Table 2: Phenotypic (rp) and genetic (rg) correlations (standard errors) between measures of scoured and greasy wool colour

Greasy colour	Scoured colour					
	SCX ^a	SCY	SCZ	SCYZ	SCYI	
^a GRX	rg	0.48 (0.23)	0.47 (0.23)	0.57 (0.21)	-0.69 (0.19)	-0.67 (0.22)
	rp	0.16	0.14	0.21	-0.28	-0.23
GRY	rg	0.50 (0.21)	0.48 (0.22)	0.59 (0.19)	-0.71 (0.17)	-0.68 (0.20)
	rp	0.14	0.13	0.21	-0.29	-0.23
GRZ	rg	0.53 (0.19)	0.52 (0.20)	0.64 (0.17)	-0.80 (0.14)	-0.76 (0.16)
	rp	0.15	0.14	0.22	-0.33	-0.26
GRYZ	rg	-0.57 (0.18)	-0.55 (0.19)	-0.70 (0.15)	0.90 (0.11)	0.85 (0.14)
	rp	-0.13	-0.11	-0.19	0.30	0.24
GRYI	rg	-0.55 (0.18)	-0.53 (0.19)	-0.68 (0.16)	0.86 (0.12)	0.81 (0.14)
	rp	-0.15	-0.13	-0.13	0.34	0.27
COL	rg	-0.50 (0.20)	-0.47 (0.21)	-0.64 (0.18)	0.87 (0.13)	0.82 (0.16)
	rp	-0.15	-0.14	-0.22	0.33	0.25

^a For abbreviations, see Footnote Table 1.

Previous studies have found a low phenotypic association between greasy and scoured wool colour and have concluded that greasy colour is not a good indicator of scoured colour (Clark and Whiteley 1977; Pattinson and Whiteley 1984). Our results agree with these findings as in no case was the phenotypic correlation between greasy colour and its corresponding measure of clean colour greater than 0.3 (Table 2).

However, the genetic correlations between measures of greasy and scoured wool colour were moderate to high. In particular, the genetic correlation between scoured yellowness (SCYZ), which is the measure of colour presently available commercially for wool sale lots in Australia, and visually assessed greasy colour score was high (0.87 + 0.13). These results suggest that selection on the basis of greasy colour score, which can be easily assessed by sheep classers, could lead to improvement in scoured wool colour in South Australian Merino sheep. Studies are needed to confirm these results in other flocks and environments.

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