



CRC

for

Premium

Quality

Wool

The Genetics of Style

Produced for the CRC for Premium Quality Wool undergraduate program by;
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Program.



Results from Fine Wool Project

Differences between bloodlines:

- limited amounts of variation between bloodlines (within strain)

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- handle
- dust penetration
- crimp definition
- staple thickness (1% to 6%)

More variation in greasy colour (16%)

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Results from Fine Wool Project

Objectively measured style: heritabilities and genetic correlations

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	O-crimpf	O-crimpr	O-dust	O-colour
O-crimpf	0.27			
O-crimpr	-0.30	0.43		
O-dust	0.01	0.03	0.10	
O-colour	0.00	0.03	-0.18	0.40



Results from Fine Wool Project

Assessed style: heritabilities and genetic correlations

	Handle	A-crimpd	A-dust	A-colour
Handle	0.22			
A-crimpd	0.45	0.09		
A-dust	0.26	0.42	0.25	
A-colour	0.44	0.28	0.30	0.29

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Results from Fine Wool Project

Genetic correlations

	Handle	A-crimpd	A-dust	A-colour
O-crimpf	0.18	-0.22	-0.55	-0.11
O-crimpr	0.51	0.03	0.49	-0.01
O-dust	0.34	0.04	-0.24	-0.23
O-colour	0.55	0.36	0.19	0.90

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Correlations between style and CFW

Selecting to increase CFW will result in:

- lower crimp frequency **-0.21**
- more regular crimp **-0.27**
- little change in dust penetration **0.09**
- whiter colour **-0.22**
- softer handle **-0.38**
- no change in assessed crimp def. **-0.03**

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Correlations between style and MFD

Selecting to reduce MFD will result in:

- little change in crimp frequency **-0.05**
- more regular crimp **0.21**
- less dust penetration **0.34**
- little change in colour **0.08**
- softer handle **0.58**
- better assessed crimp definition **0.19**

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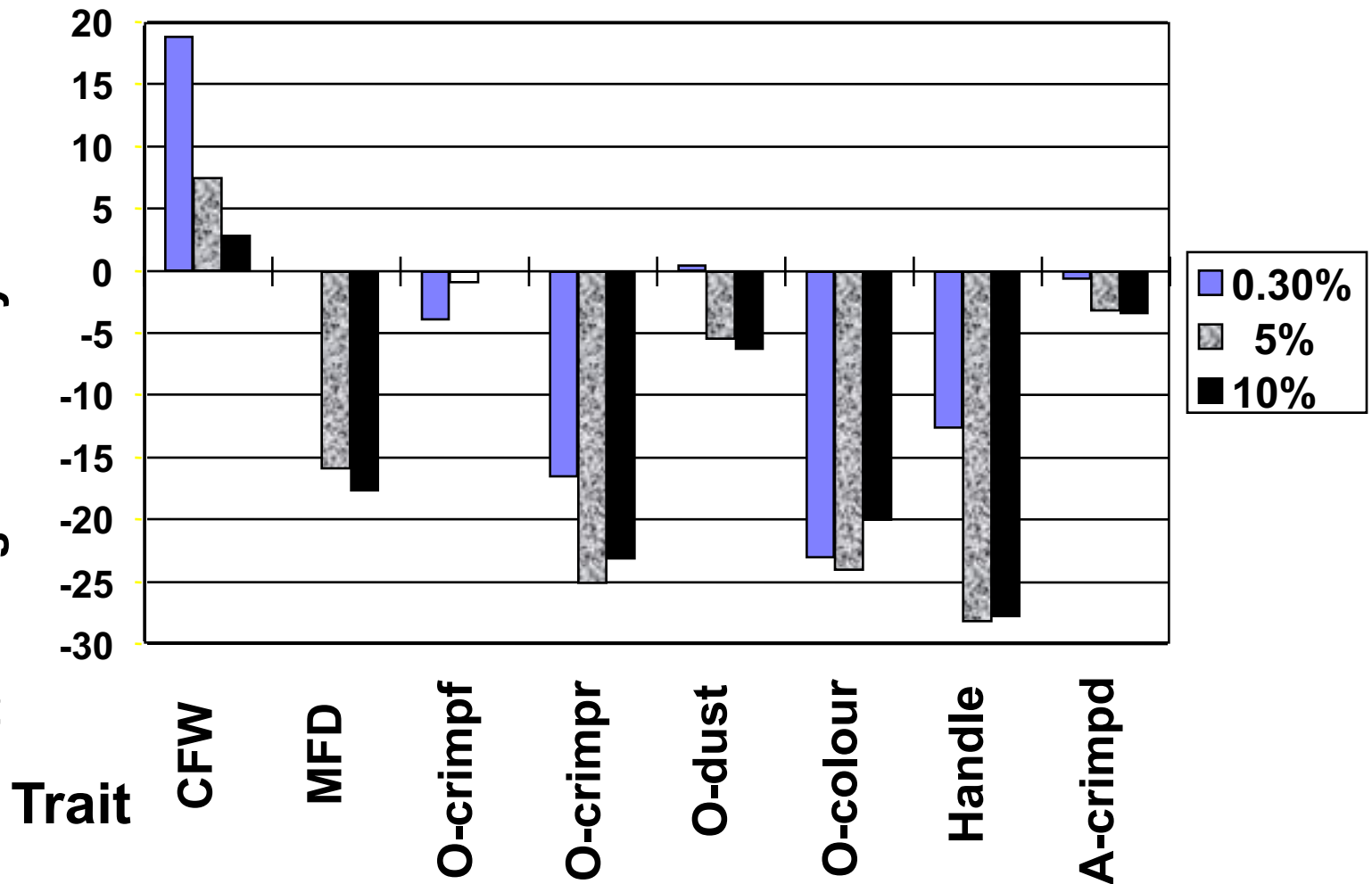
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Response to selection on CFW and MFD

% Change after 10 years of selection



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SARDI Results

- **Heritabilities**

Trait	10 mths	16 mths
handle	0.21	0.43
dust - back	0.14	0.18
dust - midside	0.32	0.21
crimp	0.53	0.43
staple	0.39	0.33
colour	0.27	0.36

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Heritabilities, phenotypic variances and predicted response to single trait selection.

Trait	Mean	Phenotypic CV (%)	h^2	% gain per year
mfd (μm)	21.1	6.4	0.71	1.9
cfw (kg)	4.3	13.3	0.31	1.7
tipl (mm)	4.9	23.9	0.20	2.0
crfreq (no/cm)	3.8	14.1	0.37	2.2
irreg (no/cm)	0.5	42.2	0.09	1.6
tipw (mm)	10.8	36.6	0.31	4.6
dust (mm)	45.1	13.7	0.42	2.4
yellow (Y-Z)	5.7	32.9	0.05	0.7

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Style Traits vs MFD and CFW: Genetic Correlations

Style Trait	MFD	CFW
tipl	0.41 ✓	0.02
crfreq	-0.44 ✗	-0.53 ✓
irreg	-0.50 ✗	-0.21 ✓
tipw	0.26 ✓	-0.56 ✓
dust	0.39 ✓	-0.10 ✓
yellow	-0.09 ✗	-0.33 ✓

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Conclusions

- **Style can be genetically improved**
- **Selection to increase fleece weight and reduce fibre diameter will improve style (as it is currently measured/assessed)**
- **Style metrology needs further development**

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