

Repeatability of fibre diameter in purebred and crossbred Merino genotypes

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The repeatability of a trait indicates the extent to which animals selected for superiority early in life will retain that superiority later in life. Ram breeders are now making selection decisions on rams aged less than 12 months with 6 months wool growth, relying on fleece measurements taken at a young age to predict future performance. Many studs and commercial producers have crossed Merino strains or bloodlines to take advantage of superior alternative ram sources, how this affects the repeatability of fibre diameter at a young age needs to be quantified. Published repeatability estimates for average fibre diameter in Merinos have been derived from purebred genotypes or crossbred genotypes greater than 15 months of age. This paper reports repeatability estimates for average fibre diameter in purebred and crossbred Merino genotypes at an early age.

Animals from the Merino bloodline crossing project (Mortimer *et al.* 1994) at Trangie NSW, used in this study comprised 125 purebred and 531 crossbred mixed sex genotypes. Purebred genotypes consisted of eight bloodlines within four Merino strains: Fine-wool (F); medium-wool non-Peppin (MNP); medium-wool Peppin (MP) and South Australian Strong wool (SS). Crossbred genotypes consisted of first cross and backcross bloodlines within strain and between strain crosses. Mid-side samples taken at hogget age (16m) shearing (12m wool growth) were divided into 2 equal segments (proximal and distal) and measured for average fibre diameter. The repeatability of average fibre diameter between 10 and 16 months of age was estimated for purebred and crossbred genotypes. Repeatability was estimated as an intra-class correlation obtained from an analysis of variance according to Turner and Young (1969). All repeatability estimates were calculated with a 95% confidence limit according to Becker (1984).

The repeatability estimates obtained for average fibre diameter between 10 and 16 months of age was similar for purebred and crossbred genotypes, this included within and between strain crosses (Table 1 and Table 2). The high repeatability estimates obtained in this study indicate that selection of superior animals for average fibre diameter at 10 months of age is a reliable indicator of superior performance at 16 months of age, irrespective of Merino genotype. These results indicate that the introduction of other bloodlines or strains into the breeding flock will not change the repeatability of average fibre diameter in the progeny, however as noted by Mortimer *et al.* (1994) the average fibre diameter of the progeny will be altered.

Table 1. Within Strain average fibre diameter repeatability estimates and confidence limits [95%CI] for purebred and crossbred genotypes, sheep numbers in italics

Genotype	Purebred	First Cross	Back Cross
Fine Wool	0.74 [0.29,0.92] <i>22</i>	0.70 [0.0,0.94] <i>7</i>	0.87 [0.0,0.97] <i>5</i>
Medium Wool Peppin	0.73 [0.57,0.84] <i>54</i>	0.87 [0.70,0.95] <i>21</i>	0.74 [0.56,0.86] <i>41</i>
Medium Wool non-Peppin	0.79 [0.61,0.89] <i>33</i>	0.85 [0.47,0.96] <i>9</i>	0.66 [0.30,0.85] <i>19</i>
Strong Wool	0.58 [0.14,0.83] <i>16</i>		

Table 2. Between Strain average fibre diameter repeatability estimates and confidence limits [95%CI] for purebred (combined genotypes) and crossbred genotypes, sheep numbers in italics

Genotype	Purebred	First Cross	Back Cross
F x MNP	0.78 [0.64,0.87] <i>55</i>	0.65 [0.32,0.83] <i>26</i>	0.77 [0.51,0.90] <i>21</i>
F X MP	0.73 [0.60,0.83] <i>76</i>	0.64 [0.31,0.83] <i>28</i>	0.42 [0.0,0.77] <i>14</i>
F x SS	0.68 [0.46,0.83] <i>38</i>	0.58 [0.07,0.85] <i>14</i>	0.81 [0.51,0.94] <i>14</i>
MNP X MP	0.76 [0.65,0.84] <i>87</i>	0.71 [0.54,0.82] <i>57</i>	0.47 [0.07,0.74] <i>22</i>
MNP X SS	0.75 [0.95,0.85] <i>49</i>	0.48[0.0,0.85] <i>10</i>	0.20 [0.0,0.83] <i>6</i>
MP X SS	0.70 [0.55,0.81] <i>70</i>	0.63 [0.30,0.82] <i>25</i>	0.60[0.15,0.85] <i>15</i>

References

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