

Phenotypic correlations between wool traits of a Döhne Merino flock

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Correlations between eight wool characteristics as well as bodymass were calculated for the Döhne Merino. Data originated from 320 ewes present in the development project on this breed at the Agricultural Research Station, Döhne.

Korrelasies tussen agt woleienskappe asook liggaamsmassa is bereken vir die Döhnermerino. Data is afkomstig van 320 ooie uit die ontwikkelingsprojek van hierdie ras by die Landbounavorsingstasie, Döhne.

Keywords: Döhne Merino, correlations, wool traits.

No results have been published on the relationship between fleece properties of the Döhne Merino breed. For this reason fleece properties of the oldest established Döhne Merino flock in South Africa were analysed to calculate relationships between them. This would also indicate whether any similarity exists between Merino and Döhne Merino fleece properties as far as these relationships are concerned. In the following report only phenotypic data are taken into consideration.

The 1979 skin and wool samples were taken of 320 Döhne Merino ewes at the Döhne Research Station. Greasy and clean fleece mass was corrected to one age-group as described by Turner & Young (1969). As a result of incomplete data no correction factors could be calculated for the other wool traits. Bodymass was corrected to the mass of 2-year-old ewes.

The correlation between different wool traits and bodymass is shown in Table 1. Owing to the large number of animals and the resulting amount of data available, the correlation coefficients between some traits are significant at very low values.

The correlation between greasy fleece mass and clean fleece production was high ($r = 0,85$, $P \leq 0,01$). Greasy fleece mass also showed a positive correlation of $r = 0,29$ ($P \leq 0,01$) with bodymass, which corresponds to phenotypic values for Merino's as determined by Brown & Turner (1968), Turner & Young (1969) as well as Heydenrych (1975). Clean fleece production proved to have a slightly higher relationship than greasy fleece mass with bodymass ($r = 0,32$, $P \leq 0,01$).

The phenotypic correlation between staple length and clean wool production was 0,30, which is in accordance with the variation found in the literature (0,30 to 0,40) as summarized by Turner (1977). Brown & Turner (1968) and Heydenrych (1975) respectively estimated a correlation coefficient of 0,37 and 0,35 for Merino's. Data of the Döhne Merino show a correlation coefficient of 0,13 and 0,14 ($P \leq 0,05$) between fibre diameter and greasy fleece mass and clean fleece mass respectively. Heydenrych (1975) calculated a relationship of

Table 1 Phenotypic correlations between traits of the Döhne Merino (D) as compared to the Merino (M)

	Breed	Greasy fleece mass	Percentage clean yield	Clean fleece mass	Fibre density	S : P ratio	Staple length	Crimp frequency	Fibre diameter	Body- mass
Greasy fleece mass	D	1 000								
	M	1 000								
Percentage clean yield	D	-0,081	1 000							
	M	0,04								
Clean fleece mass	D	0,851 ^b	0,442 ^b	1 000						
	M	0,88	0,50							
Fibre density	D	0,169 ^b	0,007	0,149 ^a	1 000					
	M	0,11 (T)		0,16 (T)						
S:P ratio	D	0,128 ^a	0,177 ^b	0,197 ^b	0,147 ^a	1 000				
	M	0,184(H)	-0,026 (H)	0,22(H)						
Staple length	D	0,152 ^a	0,311 ^b	0,297 ^b	0,142 ^a	0,093	1 000			
	M	0,23	0,35	0,37		0,27(H)				
Crimp frequency	D	-0,168 ^b	-0,241 ^b	-0,270 ^b	-0,002	-0,140 ^a	-0,145 ^a	1 000		
	M	-0,26	-0,26(T)	-0,31		-0,03(H)	-0,34(T)			
Fibre diameter	D	0,125 ^a	0,044	0,140 ^a	-0,222 ^b	-0,127 ^a	-0,118	-0,206 ^a	1 000	
	M	0,36	0,01	0,11(T)	-0,60(T)	0,16(H)	-0,15(H)	-0,22(H)		
Body-mass	D	0,291 ^b	0,102	0,320 ^b	-0,192 ^b	-0,005	-0,094	0,035	0,213 ^b	1 000
	M				-0,19(T)			0,04(T)		

^a $P \leq 0,05$; ^b $P \leq 0,01$; Values for Merinos originate from Mullaney, Brown, Young & Hyland (1969) except for T = Turner & Young (1969) and H = Heydenrych (1975).

$r = 0,29$ and $r = 0,26$ between fibre diameter and greasy fleece mass and clean fleece mass respectively for the Merino. Venter (1967a) calculated a phenotypic correlation coefficient of 0,28 and 0,26 for these two traits. Brown & Turner (1968) calculated a phenotypic and genetic correlation coefficient of 0,13 between fibre diameter and greasy fleece mass.

Fibre diameter was found to have a negative relationship with fibre density ($r = 0,22$, $P \leq 0,01$) as well as with follicle ratio ($r = 0,13$, $P \leq 0,05$).

Fibre density of the Döhne Merino showed a positive correlation with greasy and clean fleece mass ($r = 0,17$, $P \leq 0,01$ and $r = 0,15$, $P \leq 0,05$ respectively). This is in agreement with Venter (1967a) for Merino's although his comparative values were found to be insignificant. The respective correlation coefficients in the Australian Merino were found to be 0,11 and 0,16 (Brown & Turner, 1968).

Fibre density and bodymass of the Döhne Merino showed a negative correlation of $-0,19$ ($P \leq 0,01$). According to Brown & Turner (1968) as well as Turner & Young (1969) the correlation coefficient between these traits was positive ($r = 0,19$) for Merino's but not significantly so. In this study a higher bodymass was related to a higher fibre diameter ($r = 0,21$, $P \leq 0,01$) for the Döhne Merino. According to Venter (1967b) density can be determined either by the number of fibres per unit skin area, or the average fibre diameter. It appears that fibre diameter compensates for fibre density to a certain extent as progress is made with selection for bigger animals.

Döhne Merino wool is overcrimped when compared to the Duerden standards. Therefore the fibres are found to have a higher crimp frequency in relation to their fibre diameter (McMaster, unpublished data) when compared to the Duerden standards. Fourie (1981) found a phenotypic correlation coefficient of $-0,33$ between crimp frequency and fibre diameter, whilst a value of $r = 0,20$ ($P \leq 0,01$) was determined in this study for these two traits.

A higher S:P ratio for the Döhne Merino would be desirable as this value is lower than the expected intermediary value

of the parent breeds (Merino 19,8:1; Döhne Merino 12,7:1; S.A. Mutton Merino 9,7:1 according to Steinhagen, 1981).

It can be concluded that the phenotypic correlation coefficient of the Döhne Merino does not differ greatly from the values obtained for the Merino.

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