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Genetic parameters of medullation types in alpaca fiber

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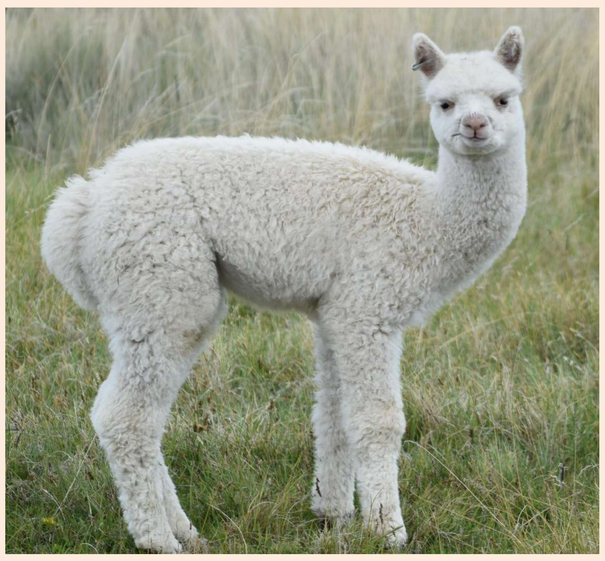
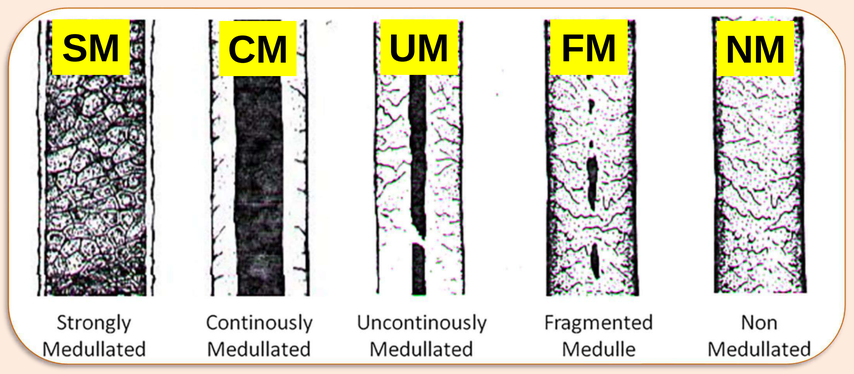
INTRODUCTION



Alpaca fiber industry competes with other noble fibers in an international market. Improving the fiber quality is mandatory with this aim, referring to reduce the incidence of objectionable fibers, such as coarse and medullated fibers.

OBJECTIVE

Estimate the genetic parameters of medullation types and the relationship with their respective diameters in alpaca fiber



FD Fiber diameter
****_FD** Fiber diameter of the ** medulla category

MATERIAL

Number of records: 3 149 from 1 626 animals with 14 457 in pedigree
Global mean of fiber diameter =20.78µm

Mean of the Percentage of medullation and fiber diameter for medullation types

Traits	NM	FM	UM	CM	SM
Medullation percentage (%)	63.18	18.16	7.86	10.46	0.34
Fiber Diameter (µm)	18.88	22.15	24.57	28.10	45.96

Compositional data methodology: Medulla types in percentage were transformed to the centred log-ratio (CLR) (Aitchison, 1986) :

$$CLR(x_i) = ln\left(\frac{x_i}{\sqrt[n]{x_1 \cdot x_2 \cdot \dots \cdot x_n}}\right)$$

METHODS

$$\mathbf{y} = \mathbf{Xb} + \mathbf{Zu} + \mathbf{Wp} + \mathbf{e}$$

b = Fixed effects: color (white *vs* cream), sex, year (3 levels), age as linear and quadratic covariate
u = Additive genetic effect
p = permanent environmental effect

VCE 6.0

RESULTS

Heritabilities (in diagonal), and genetic correlations (above diagonal), for medullation types in alpacas. All standard errors were lower than 0.03.

	NM	FM	UM	CM	SM
NM	**0.25**	0.23	-0.29	**-0.65**	**-0.57**
FM		0.18	**0.60**	**-0.45**	**-0.66**
UM			0.10	0.15	**-0.51**
CM				0.20	0.15
SM					**0.11**

Heritabilities (in diagonal), and genetic correlations (above diagonal), for fiber diameter according to the medullation categories in alpacas. All standard errors were lower than 0.04.

	FD	NM_FD	FM_FD	UM_FD	CM_FD	SM_FD
FD	**0.29**	**0.81**	**0.41**	0.22	0.04	0.06
NM_FD		**0.27**	0.81	0.66	0.55	0.06
FM_FD			**0.35**	**0.94**	**0.86**	-0.28
UM_FD				0.30	**0.97**	-0.21
CM_FD					0.25	-0.10
SM_FD						**0.10**

Heritabilities moderate for NM, FD, NM_FD, FM_FD and UM_FD. Heritabilities low for SM and SM_FD

Relevant genetic correlation between NM and FM with CM and SM, the objectionable fibers.

CONCLUSION

The reduction of FD and increase of NM and FM fiber would perform optimal results in removing the coarsest fibers and consequently the itching.