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Authors
B. Bapst [1], K. Schwarz [2], S. Thüer [2] and S. Werne [2]

[1] Qualitas AG, 6300 Zug, Switzerland
[2] Research Institute for Organic Agriculture (FiBL),
5070 Frick, Switzerland

Genetic parameters for nematode resistance in dairy sheep

Background

In sheep it has been shown that selection towards an increased nematode resistance is feasible by using Faecal egg count as a trait. Auxiliary, cheaper resistance-traits would be most welcome. FAMACHA©, a colour classification of the eyelid, could serve as such.

Method

Therefore, we collected FAMACHA©, packed cell volume and Faecal egg count phenotypes of approx. 1150 naturally infected Lacaune ewes on 15 commercial farms in Switzerland. A multi-trait animal model was applied to estimate genetic parameters.
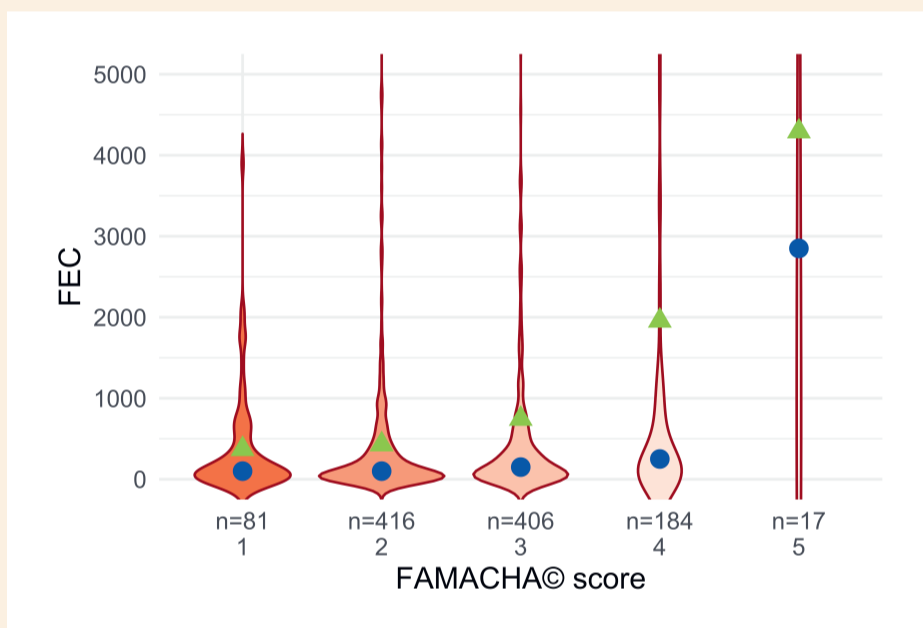
Results

Fig. 1: Violin plot of Faecal egg count (FEC) and FAMACHA© for each score. The median and the mean are indicated by a blue dot and a green triangle, respectively.
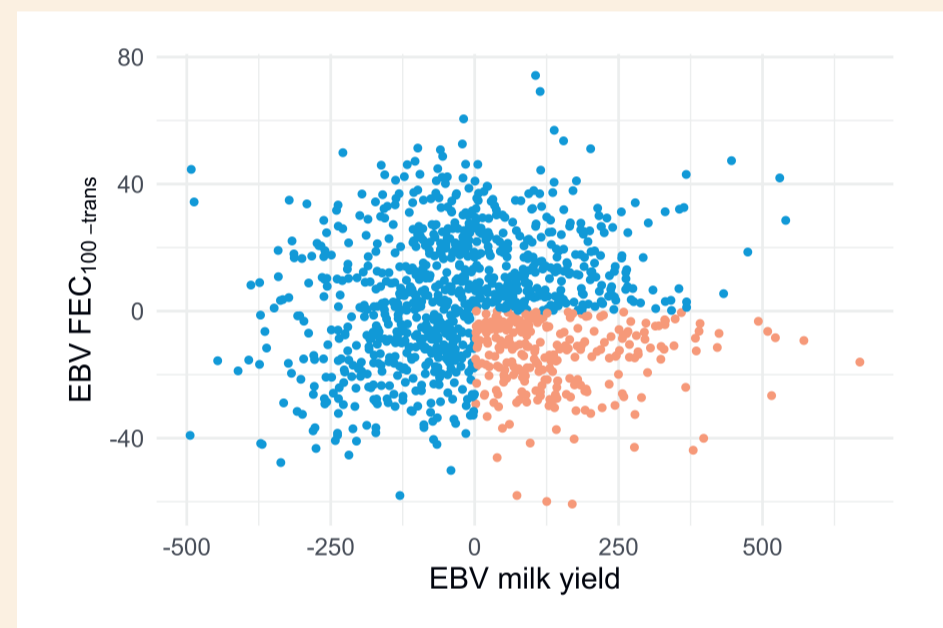

Fig. 2: Scatter plot of estimated breeding values (EBV) of transformed Faecal egg count (FEC100_trans) and milk yield in dairy sheep. Animals suitable for selection are indicated by red dots.

Trait/Trait	FEC	FAMACHA	PCV	Milk yield
FEC	0.33 (0.08)	0.03 (0.22)	0.01 (0.21)	0.07 (0.22)
FAMACHA	0.25 (0.03)	0.30 (0.08)	-0.47 (0.19)	0.23 (0.21)
PCV	-0.36 (0.03)	-0.35 (0.08)	0.36 (0.08)	-0.11 (0.20)
Milk yield	0.16 (0.03)	0.07 (0.03)	-0.20 (0.03)	0.34 (0.08)

Tab. 1: Phenotypic (lower triangular) and genetic correlations (upper triangular) between Faecal egg count (FEC), FAMACHA©, Packed cell volume (PCV) and milk yield in dairy sheep. Heritabilities are on the diagonal.

Conclusions

We conclude that if Faecal egg count is used as trait, the Swiss Lacaune dairy sheep population could be selected for lower susceptibility towards nematode infection. The use of FAMACHA© as auxiliary trait for Faecal egg count is not feasible, due to an inexistent genetic correlation of these two traits.

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