

Genetic relationship of eye infection and grading traits in Finnish blue fox



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Introduction

- ✿ Frequency of eye infection has increased over the past decade in foxes
- ✿ 45.2 % of foxes had eye infection in this two years' single farm study (n=2,076)
- ✿ It causes economic losses through reduced selection intensity
- ✿ It's painful and reduces animal's wellbeing
- ✿ Etiology of eye infection is unknown

Objective

- ✿ Estimate genetic and phenotypic correlations between eye infection, animal size and grading traits, which were suspected to be predisposing factors

Methods

- ✿ Eye infection was analysed as a binary trait (0=infected, 1=healthy)
- ✿ Fixed effects in the linear animal model were: housing system (shed or hall), birth-year (2005 or 2006), sex (male or female), cage pair (males, male-female pair or females), date of birth (four classes) and age of dam (1, 2 or 3 years)
- ✿ Random effects were: litter (dam by litter-year interaction), animal and residual
- ✿ Variance components were estimated using DMU
- ✿ Genetic correlations were estimated with multiple-trait animal model, three traits at a time



Results

- Heritability estimate of eye infection was moderate 0.24 ± 0.07

Genetic correlations

- Thick underfur (grading density) had unfavourable genetic correlation (-0.46 ± 0.20) with eye infection
- Genetic correlations between eye infection and size traits (body weight, length, fatness and grading size) did not differ from zero
- Fatness had high positive genetic correlation with fur density ($r_g = 0.84 \pm 0.10$)

Phenotypic correlations

- Phenotypic correlations between eye infection and size traits were low and unfavourable (from -0.11 to -0.16)



Conclusions

- Genetic improvement through selection shows potential for improving eye health
 - Farms should have an adequate control and culling strategy against eye infections
 - If selection needs to be more efficient, selection index can be applied
- Single trait selection for better eye health may impair fur quality such as density due to antagonistic response to selection
- Folds of skin on face caused by excessive subcutaneous fatty tissue, massive coat and/or loose skin may aggravate mild eye disease
- Whether the eye infection is due to structural eye disease or genetic differences in disease resistance remains to be solved in further studies

